

# IRON AGE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 102 Reade St., New York.

Vol. LIII: No. 25.

New York, Thursday, June 21, 1894.

Reading Matter Contents.....page 1206  
Classified List of Advertisers.... " 99  
Alphabetical Index to Advertisers " 103  
Advertising and Subscription Rates " 1229

Year, including Postage,  
Copies, Ten Cents.

## BLANKS.

U. M. C. Blank Cartridges for Fourth of  
July, 1894.

LOUDEST REPORT.

The Union Metallic Cartridge Co.,  
BRIDGEPORT, CONN.

Ask Your Dealer For U. M. C. Blanks.

**RANDOLPH & CLOWES,**  
WATERBURY, CONN.,

Manufacturers of Seamless Drawn Brass and Copper Tubing and Large Shells, Brazed  
Tubes and Mouldings, Sheet Brass, Sheet Copper, German Silver.

—SOLE MANUFACTURERS OF—

**Brown's Patent Seamless Drawn Copper House Boilers.**

**CANNOT COLLAPSE. WILL NOT LEAK.**

Ordinary weight tested to 200 lbs., extra heavy to 300 lbs. pressure per square inch. Made of two Seamless Drawn Copper Shells. Handsomest, best and strongest and safest boiler in the market and cheapest in the end. Send for circular and instructions to prevent accidents from freezing, &c., &c.



**TO THOSE INTERESTED IN OR USING VALVES.**

We have recently made improvements in the manufacture of **JENKINS BROS.' VALVES** having increased the number of bolts, thickness of flanges, &c.

We shall manufacture *one grade of valve only*, suitable for high or low pressure steam. The Jenkins Discs used in these valves are suitable for high or low pressure. We guarantee all valves stamped with Trade-Mark.

**JENKINS BROS.,**

NEW YORK.

PHILADELPHIA.

BOSTON and CHICAGO.

**It Pays to Handle "COPPERIZED" Oilers, &c.,**  
Stamped Seamless from the Wilmot & Hobbs Mfg. Co.'s Celebrated Cold Rolled "SWEDOH" Steel,

**BECAUSE:**

**FIRST.** They are all perfect in construction and finish both inside and outside, are exceedingly durable, work perfectly, do not come back because of defects, but stay sold once and for all and sell at sight because of their beauty and very substantial construction.

**SECOND.** The manufacturers make the goods principally to illustrate how their celebrated Cold Rolled "SWEDOH" Steel can be stamped, drawn and plated, and in consequence of this excellent advertisement and their unequalled facilities for their manufacture, are enabled to offer a wonderfully large and fine line of goods at a very low price.

**THIRD.** The Oilers are also thoroughly advertised and the manufacturers refer purchasers to those dealers who carry a stock, and they do not solicit trade from consumers, but carry out a broad minded policy in all their dealings. They carry at all times an immense stock of all the numerous sizes and fill orders promptly. All houses ordering a stock of \$100 to \$200 worth assorted sizes will be furnished free 3,000 small envelope size catalogues or price-lists "C" illustrating some two dozen sizes of Oilers, &c., printed in copper, bronze and nickel and the jobber's name and address will also be printed in bronze. Have you seen the salesmen's dissected samples of No. 13 size?

**BEWARE OF CHEAP AND INFERIOR IMITATIONS** of our "COPPERIZED" OILERS, &c., or any goods infringing our Trade-Marks or Patents, AS WE SHALL PROTECT OUR INTERESTS TO THE FULL EXTENT OF THE LAW.

**ONE HUNDRED DOLLARS REWARD** offered for any information which results in our convicting parties so infringing.

**Rainey Connellsville Coke.**  
Furnace and Foundry

The only Coke you can buy and know you are getting the best that can be manufactured. All our works in the heart of the Region, within four miles of Connellsville, Pa.

**CAPACITY 4,000 TONS DAILY.**

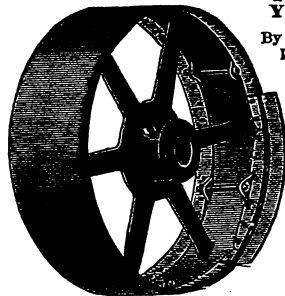
**W. J. RAINEY,**

MAIN OFFICE:  
Mercantile Bank Building.

**CLEVELAND, OHIO**

Hosted by Google

**SAVE YOUR POWER  
YOUR BELTS,  
YOUR MONEY**



By covering your  
pulleys with

**SHULTZ**

Patent

Leather

Pulley

Covering

Send for Circular I  
to

**SHULTZ BELTING  
CO.,**

ST. LOUIS, MO.  
NEW YORK, N.Y., 113 Liberty St., A. B. Laurence, Mgr.  
BOSTON, MASS., 164 Summer St., G. J. Kelley, Mgr.  
PHILADELPHIA, PA., 129 N. 3d St., J. Garnett, Mgr.

**VALLEY STEEL CO.,**

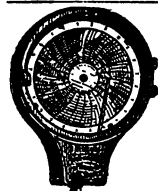
ST. LOUIS

Manufacturers of

**STEEL CUT NAILS,**

RAILS,

CHANNELS AND MERCHANT STEEL.



Every Steam Plant  
Should be provided with  
**BRISTOL'S RECORDING  
PRESSURE GAUGE.**

Low in Price and Guaranteed.  
Send for circulars and fac-simile  
chart.

**THE BRISTOL CO.,**  
Waterbury, Conn.

**BRAIDED CORD.**



Samson and Massachusetts Brands.

Send for Samples.

**SAMSON CORDAGE WORKS, Boston, Mass.**

**TURNBUCKLES.**



BRANCH OFFICE: 136 Liberty St., New York.  
Cleveland City Forge and Iron Co., Cleveland, O.

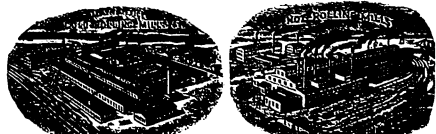
**The Wilmot & Hobbs Mfg. Co.,**

MAIN OFFICE, MILLS AND FACTORIES AT

**BRIDGEPORT, CONN.**

STORE, 24 MURRAY ST., NEW YORK.

(CONNECTED BY TELEPHONE.)



Annual Capacity 15,000  
tons.

Annual Capacity 30,000  
tons.

**BESSEMER, OPEN HEARTH,  
and the Celebrated and Unequalled  
"SWEDOH"**

(REGISTERED TRADE-MARK.)

Hot Rolled also Cold Rolled  
Sheet, Band and Strip Steel

Also COPPERIZED OILERS, Etc.

SEE FRONT AND BACK COVER for  
Special Notice to the Trade.

THE  
**ANSONIA BRASS**  
AND **COPPER CO.**  
MANUFACTURERS OF  
**BRASS AND COPPER**  
Seamless Tubes, Sheets, Rods and Wire.

**Ingot Copper.**

SOLE MANUFACTURERS

**Tobin Bronze**  
(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,  
Square and Hexagon Bars, for Pump  
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York

THE  
**New Haven Copper Co.,**  
SOLE MAKERS OF

**POLISHED COPPER**

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND

DEALERS IN

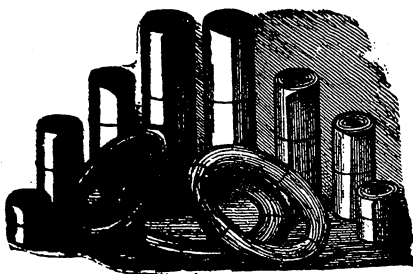
**BRAZIERS' & SHEATHING COPPER,**

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



**Waterbury Brass Co.**

Established 1845.

Sheet, Roll and Platers' Brass,

German Silver, Copper, Brass and Ger-  
man Silver Wire, Brass and  
Copper Tubing,

**COPPER RIVETS AND BURS,  
PERCUSSION CAPS,  
TAPE MEASURES,  
METALLIC EYELETS,**

Brass Kettles, Brass Tags, Powder Flasks,  
Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION.  
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or  
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S  
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Provi-  
dence, R. I.

MILLS AT WATERBURY, CONN.

WHEN IN WANT OF  
ANYTHING IN

**BRASS  
AND  
COPPER**

WRITE

**ROME BRASS & COPPER CO.,  
ROME, N. Y.**

**THE PLUME & ATWOOD MFG. CO.**

MANUFACTURERS OF

**Sheet and Roll Brass**

—AND—

**WIRE,**

GERMAN SILVER AND, GILDING METAL,  
COPPER RIVETS AND BURS, COP-  
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,  
Kerosene Burners, Lamp  
Trimnings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,  
THOMASTON, CONN.

FACTORIES:  
WATERBURY, CONN.

**SCOVILL MFG. COMPANY,**

Manufacturers of

**BRASS**

Sheet, Wire, Tubes.

**BUTT HINGES,  
BUTTONS,  
LAMP GOODS,  
NOVELTIES.**

**PURE ALUMINUM**

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

428 Broome Street, New York.

210 Lake Street, Chicago.

29 High Street, Boston.

**JOHN DAVOL & SONS,**

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

**COPPER, TIN, SPELTER,  
LEAD, ANTIMONY.**

100 John Street. - New York.

**WILLIAM S. FEARING.**

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

*Sheet Brass, Fancy Sheet Brass,  
German Silver, Copper, Brass  
and German Silver Wire,  
Braided and Seamless Brass and  
Copper Tubes, Brass and Cop-  
per Rods, Brass Ferrules,  
Pure Copper Wire,  
Sheet and Ingot Copper, Spelter,  
Tin, Antimony, Lead, &c.*

**MATTHIESSEN & HEGELER ZINC CO.,**

LA SALLE, ILLINOIS,

**SMELTERS OF SPELTER**

AND MANUFACTURERS OF

**SHEET ZINC AND SULPHURIC ACID.**

Special Sizes of Zinc cut to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

**ZINCS FOR LECLANCHE BATTERY.**

**BRASS GOODS MFG. CO.,**

Mrs. of Stamped Brass, Silver and Nicked Goods, Brass Labels for Cans and Rubber Moulds.

**BRONZE DOOR KNOBS**

Brass and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin  
Cushion Business Cards, Mucilage Brushes. Novelities of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.

**BOOKS.** YOU CAN OBTAIN PROMPTLY the latest  
work on any subject in which you are  
interested by addressing DAVID WILL-  
IAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

**HENDRICKS BROTHERS,**

Proprietors of the

**Belleville Copper Rolling Mills,**

Manufacturers of

**Braziers', Bolt and Sheathing**

**COPPER.**

**COPPER WIRE AND RIVETS.**

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.  
49 CLIFF ST., NEW YORK.

**MISSOURI  
METAL COMPANY,**

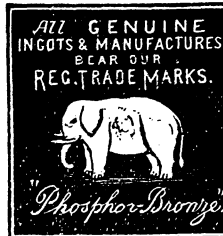
923 Security Building,

**ST. LOUIS.**

**SPELTER.**



**ELEPHANT  
BRAND**



**PHOSPHOR-BRONZE**  
INGOTS, CASTINGS, WIRE, SHEET &c.  
THE PHOSPHOR BRONZE SMELTING CO. LIMITED  
2200 WASHINGTON AVE. PHILADELPHIA, PA.  
ORIGINAL MANUFACTURERS OF PHOSPHOR-BRONZE IN THE UNITED STATES AND SOLE MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

**PHOSPHOR  
BRONZE.**

## Parsons' Manganese Bronze and White Brass.

MADE IN THE UNITED STATES EXCLUSIVELY BY

**THE WILLIAM CRAMP & SONS SHIP and ENGINE BUILDING CO.,  
PHILADELPHIA, PA.  
MANGANESE BRONZE PROPELLERS**

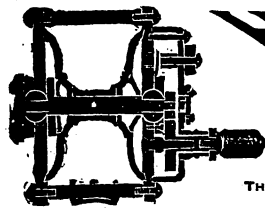
—ARE USED BY THE—

Cunard, Pacific Mail, Hamburg American, White Star, International, Morgan, Canadian Pacific, North German Lloyds and many other Steam Ship Companies, and principal Naval Powers.

**Parsons' White Brass; the Most Approved Anti-Friction Metal.**

G. DOUGLAS PETRIE, Agent,

Nos. 39 & 41 Cortlandt Street, New York.



**HENDRIX**  
Solicits Correspondence about  
Fishing Reels for 15 Cents to 20 Dollars each.  
Brass Bird Cages "50" "12" "  
Japanned "25" "10" "  
Standard Bronze, Brass and Steel Chain.  
Standard Wire Picture Cord.

THE ANDREW B. HENDRIX CO., NEW HAVEN, CONN., U. S. A.



**THE F. L. GAYLORD CO.,  
—MANUFACTURERS—**

Aluminum Bronze Castings, Aluminum Bronze Sheets, Aluminum Bronze Ingots and Pure Aluminum Castings.

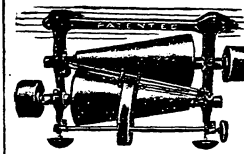
Box 1147, Ansonia, Conn.

## Rough Casting of Aluminum.

Aluminum Bronze, German Silver Bronze and all kinds of Metals. Manufacturers of Chandeliers, Metal Picture Frames, Ink Stands, Figures, Statues, etc. Stair Carpet Holders a Specialty.

St. Louis Bronze & Aluminum Works,  
3741-3743 North Broadway,  
ST. LOUIS, MO.

## EVANS FRICTION CONES.



For regulating the speed of machines automatically or by hand. Thousands of sets in operation driving all kinds of machinery which require from 1 to 50 H.P. Address Evans Friction Cone Co., 85 Water Street, Boston, Mass.

THE CRESCENT TRY IT! AND YOU WILL USE NO OTHER

**THE CRESCENT BRAND  
PHOSPHOR  
TIN.**

THE HIGHEST AND RICHEST GRADE MADE

MANUFACTURED ONLY BY  
THE CRESCENT PHOSPHORIZED METAL CO.  
OFFICE AND WORKS  
2107-2109 and 2111 INDIANA AV. PHILADELPHIA, PA.

## CROWN SMELTING COMPANY,

Chester, Pa.

**Bronze, Brass and Composition Castings.**

Inventors and Sole Manufacturers of

**"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."**

Manufacturers of PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.

Specifications in ingot metal or castings.

## The W. W. & R. M. KEYS CO.,

Bronze, Composition and Brass Castings of all kinds, also Babbitt Metals.

BRIDGEPORT, CONN.



Guaranteed Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal. It is used on bearings where no other known metal will stand.

Theo. Hertz & Son, Sole Mfrs.,

30th St. and Park Ave., St. Louis, Mo.

Mfrs. Babbitt Metals, Solder, Lead Car Seals, etc.

## PHOSPHOR-TIN

BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE OF PHOSPHOR BRONZE THEMSELVES BY THE SIMPLE PROCESS OF MELTING. MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET-NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS AND PRICE ADDRESS HALK & NAUMANN, NEW-YORK. SOLE AGENTS FOR THE U.S. AND CANADA. 3 YEARS.

## The American Metal Co.

(LIMITED),

Levin Building, 80 Wall St., New York.

P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.  
TIN, LEAD, SPelter, ANTIMONY, NICKEL,  
ALUMINUM, BULLION, IRON.

**Advances made on Consignments**

AGENTS FOR

Henry R. Merton & Co., - - London.  
Metallgesellschaft, Frankfurt-on-Main.  
Williams, Foster & Co., Ltd., Swansea.

## Boston Casting Co., 122 W First St., So. Boston, Mass.

MANUFACTURERS OF

**WROUGHT IRON  
CASTINGS.**

We make sound, soft Wrought Iron Castings with a tensile strength of 60,000 to 70,000 pounds per square inch and guarantee the same to be expressly adapted for mechanical and electrical work. The castings will be true to pattern with a shrinkage of one quarter of an inch to the foot. This company is in no way connected with any other.

A

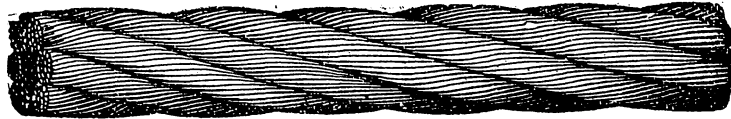
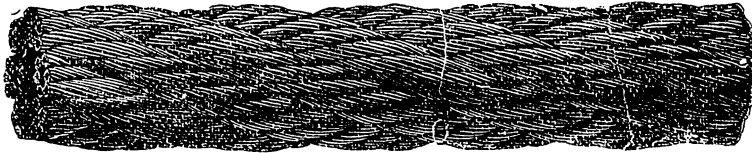
# Washburn & Moen Manuf'g Co.,

WORCESTER, MASS., NEW YORK CITY, CHICAGO.

MAKERS OF IRON, STEEL AND COPPER

EVERY VARIETY OF **WIRE** FOR ALL PURPOSES.  
**WIRE ROPE AND CABLE.**

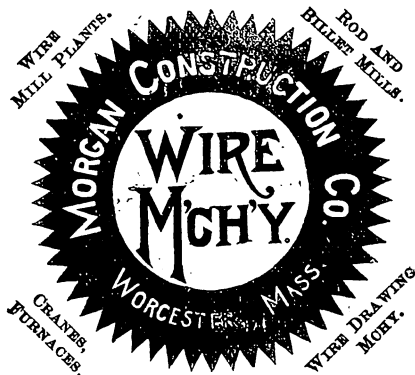
Hard and Soft Drawn Copper Wire for Electrical Purposes; Galvanized Iron and Steel Telegraph and Telephone Wire; Glidden Patent Steel Barb Wire; Watch and Clock Main Springs; Eyeglass Springs; Steel Wire for Needles and Drills; Patent Steel Wire Bale Ties; Pump Chain; Two Strand Twisted and Flat Twisted Fence Wire without Barbs; Fence Staples, Stretchers, &c.; Bright, Annealed, Tinned and Galvanized and Copper Wire, on Spools 1 oz. to 1 lb



Galvanized Iron Wire Rope for Ships' Rigging, &c. Galvanized Steel Wire Cables for Suspension Bridges. Transmission and Standing Ropes, Hoisting Ropes, Tiller Ropes, Switch Ropes, Copper, Iron and Tinned Sash Cord, Phosphor Bronze and Copper Wire Rope, Wire Clothes Lines, Picture Cord, Galvanized Wire Seizing, and all the Fixtures and Appliances required for use with the foregoing. The famous yachts Mayflower, Volunteer and Sachem are all rigged with our Wire Rope.

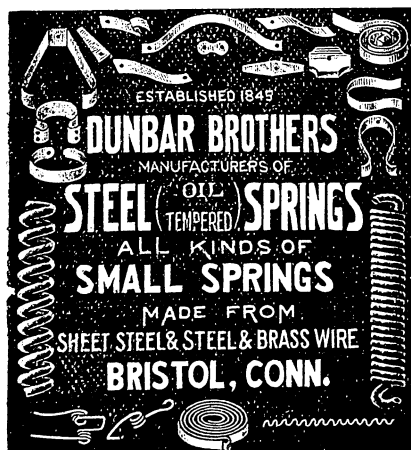
SEND FOR PRICE-LISTS, CIRCULARS AND DESCRIPTIVE PAMPHLETS.

New York Warehouses, 16 Cliff St., and 241 Pearl St. Chicago Warehouse, 107 & 109 Lake St. San Francisco Warehouse, 8 & 10 Pine St.



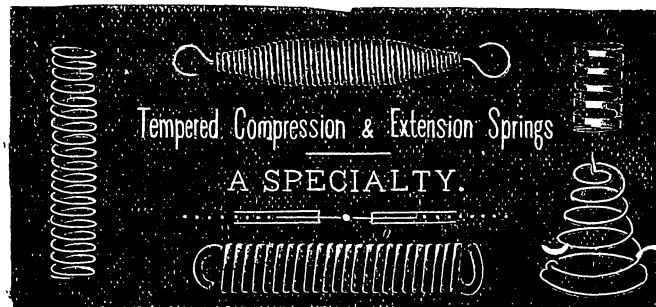
WM. MCFARLAND,  
IRON FOUNDER,  
TRENTON, - - N. J.  
**Chilled Cast Wire DIES**  
A SPECIALTY.  
Any Size or Style Made at Short Notice.

**J. F. KAY,**  
PASSAIC, N. J.  
MACHINERY FOR MAKING OF  
WIRE STRAND AND ROPE.  
Winding, Stranding and Closing Machines, &c. Electric Wire and Cable Machinery. Hemp Rope and Cordage Machinery.  
Plans and Estimates.



**MILLER & VAN WINKLE,**  
MANUFACTURERS OF  
**STEEL WIRE AND STEEL SPRINGS.**

TEMPERED STEEL WIRE.



MACHINERY SPRINGS.

OFFICE AND WORKS: }  
18 to 24 Bridge Street, } BROOKLYN, N. Y.

**BOOKS**

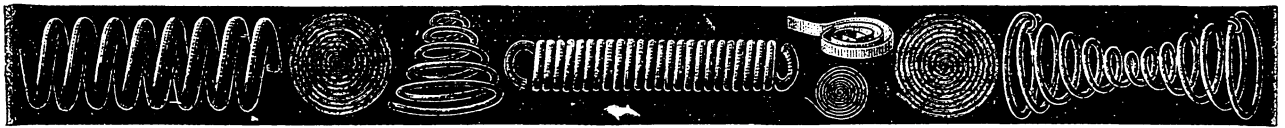
THE NEWEST BOOKS ON Metal Working, Iron, Steel and Metallurgy; Mining, Mechanical and Civil Engineering; Casting and Foundry; Electricity and Electric Lighting; Draftsmanship, Architecture and Building, promptly supplied on receipt of price.  
SEND FOR CATALOGUES, mentioning the kind of books you are looking for.

DAVID WILLIAMS, 96-102 Reade St., New York.



117th to 118th Street and Harlem River.

General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

## STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

THE LONGEST COIL OF STEEL EVER ROLLED OF ITS DIMENSIONS, 2½ IN.

WIDE x **2250 FEET LONG** x .00425 IN. THICK.

SUPERIOR STEEL COMPANY, - Pittsburgh, Pa.

— MANUFACTURERS OF ALL DESCRIPTIONS OF —

## HOT and COLD ROLLED STRIP STEEL.

In widths up to 10 inches and in thickness from .0025 to 2 inches and from ordinary hot rolled soft steel to the finest cold rolled watch mainspring steel. Fine crucible steel our specialty.

*Coils Furnished up to 5000 feet long according to width and gauge ordered.*

— AGENCIES: —

Ely & Williams, 38 Park Row, New York; 1239 Market St., Philadelphia, Pa.; Samuel T. Rolley, 1030 Monadnock Bld'g, Chicago.

## Wire Cloth AND Wire Goods

Hardware Grade and Fanning Mill Wire Cloth, Poultry Netting, Heavy Window Screen Wire Cloth, Coal and Sand Screens, Riddles, Ash Sieves, &c., &c.



Office and Counter Railings, Elevator Enclosures, Wire Stall Guards, Hay Racks Feed Boxes, Window Guards, &c., &c.

BUFFALO, N. Y.

VOLUTE,  
WIRE  
and  
FLAT STEEL

# SPRINGS

Agricultural Implements, Machinery and various other purposes. Write for prices to

**SABIN MACHINE CO.,**  
MANUFACTURERS.  
MONTPELIER, VT.

## SPRINGS—RIVETS.

Specialties in

SHEET METAL WORK,  
CLOCK and INDICATOR POINTERS,  
CLARK & COWLES, Plainville, Ct.

THE

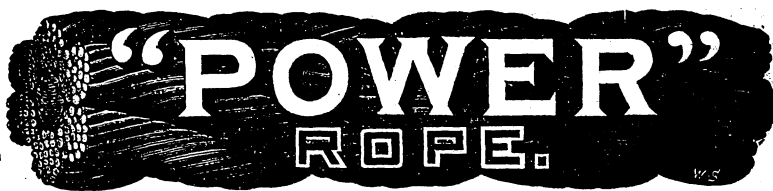
## WIRE GOODS COMPANY,

Worcester, Mass.

Hardware and Kitchen Wire Goods. Specialties to order. Everything in Wire.

The Practical Polish and Varnish Maker. By H. C. STANDAGE. A treatise containing 750 receipts and formulae for the manufacture of varnishes, polishes, &c. 12mo. cloth.....\$2.50  
For sale by David Williams, 96-102 Reade St., N. Y.

**Always  
Ask  
For**



**Unequaled for Strength  
and Durability.**

Made Only by

**Broderick & Bascom Rope Co.,  
St. Louis, Mo.**

**HOWSON  
AND  
HOWSON**

**Counsellors at Law  
Solicitors of Patents**

**PHILADELPHIA**

Forrest Building, 119 S. 4th St.

**NEW YORK**

Potter Building, 38 Park Row.

**WASHINGTON**

Atlantic Building, 928 F St.

**PATENTS**

**U. S. and Foreign Secured.**

Trade Marks and Copy Rights. **Twenty Years' Experience.** Send model or sketch and brief description of your invention for **Free** report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents," Free.

**PATENT PRACTICE EXCLUSIVELY.**

References Furnished on Application.

**E. B. STOCKING, Attorney at Law,  
611 F ST., N. W., WASHINGTON, D. C.**

**CHARLES N. BUTLER, C.E.,  
ATTORNEY IN PATENT CASES**

811 Mutual Life Building,  
Tenth and Chestnut Sts., **PHILADELPHIA, PA.**

Formerly of the Examining Corps,  
U. S. Patent Office.

**PATENTS.**

**H. W. T. JENNER, Patent Attorney and Mechanical Expert,** 519 Seventh St., Washington, D.C. Charges moderate. Write for terms. Established 1883.

**W. S. ESTEY,**

No. 65 FULTON ST., NEW YORK,

MANUFACTURER OF

**WIRE CLOTH**

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. **Locomotive Spark Wire Cloth, &c.,**

—AND—

**WIRE WORK**

For Bank, Office and Counter Railing, Store Fronts, Window Guards, &c.

Galvanized Twist Netting.

**Oliver's Patent Decoy Rat Traps.**

**S T Pat. Adjustable Foundry Riddles.**

**S T SAND SCREENS.**

SEND FOR CATALOGUE.

**PHILLIPS, TOWNSEND & CO.**

North Penn Junction, Philadelphia.

**WIRE NAILS, - - -**

**- - NORWAY RIVETS.**

Rivets marked "P" are not of our make. We make only first-class Norway IRON RIVETS.

**A. LESCHEN & SONS' ROPE CO.,**  
MANUFACTURERS OF

Trade-Mark.



Registered.

**ST. LOUIS, MO.**

**CORRESPONDENCE INVITED.**



**WAREHOUSES: 87 Liberty St., New York.**

WORKS:

**Wilkesbarre, Pa.**

**NEW HAVEN WIRE MFG. CO.,**

Manufacturers of

**WIRE**

in great variety.

**NEW HAVEN,**

**CONN.**

Represented in New York by HENRY B. NEWHALL CO., 105 Chambers St.

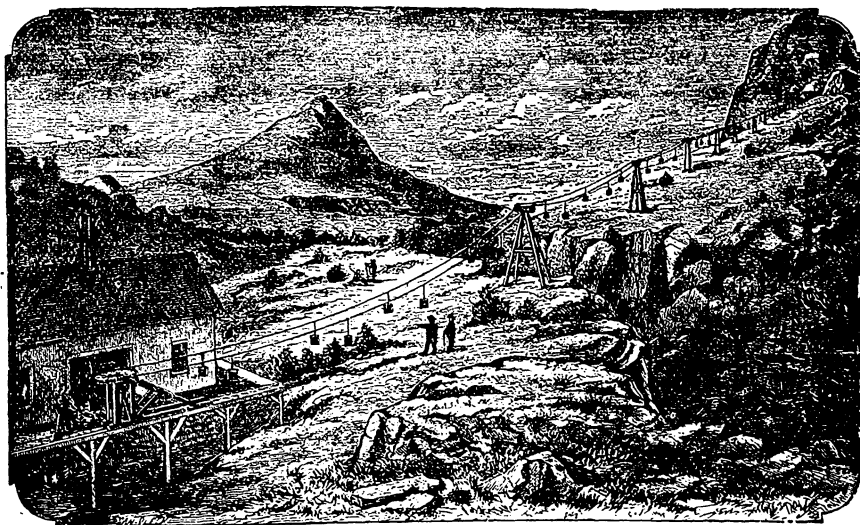
**HERCULES WIRE. PATENTED.**



Absolutely the best general purpose Fence Wire on the market to-day. Write for prices  
**CLEVELAND FENCE CO., 21 Biddle St., INDIANAPOLIS, IND.**

**CALIFORNIA WIRE WORKS,**

**509-511 Market St., - San Francisco, Cal.**



MANUFACTURERS OF

**WIRE ROPE FOR CABLE RAILWAYS AND MINING PURPOSES.**

**HALLIDIE'S PATENT WIRE ROPEWAY,**

Simplest and most economical means of transportation. Send for Illustrated Catalogue.

**HOWARD & MORSE**  
 45 FULTON ST.  
 NEW YORK.  
 HEAVY MINING  
 COPPER,  
 BRASS,  
 STEEL  
 OR IRON  
 WIRE CLOTH.

ALSO  
 MANUFACTURERS OF  
 GENERAL  
 WIRE WORK.  
 Window Guards,  
 Stable Fixtures,  
 RAILINGS,  
 Sand Screens  
 Coal Screens  
 Etc.

**WICKWIRE BROTHERS,** CORTLAND, N. Y.  
 MANUFACTURERS OF  
 Wire Cloth and Wire Goods,  
 Coal Sieves, NEW PROCESS  
 Flour Sieves, Cortland  
 Corn Poppers, POWER LOOM  
 Dish Covers, WIRE CLOTH.  
 Metallic Every roll wrapped in Pink  
 Coal Sieves. Paper and has our name on  
 label.



**Kilmer Manufacturing Co.** ——— Newburgh, N. Y.

Manufacturers of **BALE TIES** For Baling  
 Hay, Straw,  
 Rags,  
 Excelsior, &c.

ALSO WIRE RODS, BARB WIRE, COILED STEEL WIRE, WIRE STAPLES, GAL-  
 VANIZED WIRE, ORNAMENTAL FENCING, &c., &c.

Western Warehouse, 543 and 545 State Street, Chicago, Ill.  
 Western Office, 21 Quincy Street, Chicago, Ill.  
 New York Office, 111 Water Street, New York City.  
 Works and General Office, Newburgh, N. Y.

**Fly Screen Cloth.**

• • • FULL STOCK OF ALL WIDTHS BOTH • • •

== Green and Black. ==

**Ludlow-Saylor Wire Co.,**

114 and 116 So. 4th St., St. Louis, Mo.

**THE VAN DORN IRON WORKS CO.,** Cleveland, Ohio.



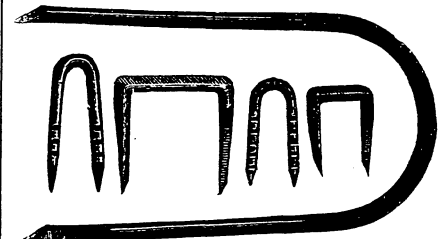
Office and Salesroom, 157½ Euclid Ave.,  
 MANUFACTURERS OF  
**WROUGHT IRON FENCE AND RAILING.**  
 Stable Fixtures, Crestings, Terminals, Wire Office and  
 Counter Railing, Lawn Seats and Vases.  
 Iron and Steel Jail Cell Work. Orna-  
 mental and Structural Ironwork.

**PERFORATED SHEET METALS**  
 OF EVERY DESCRIPTION.



**THE HENDRICK MFG. CO., LTD.,**  
 CARBONDALE, PA.

**E. H. Titchener & Co.,**  
 BINGHAMTON, N. Y.  
 —MANUFACTURERS OF—



**STAPLES in All Varieties,**  
 Double-Pointed Tacks, Bed Links, Etc.  
 New York City Agents, HARMON & DIXON,  
 118 Chambers Street.

**Quick Shipment. Write for Prices.**

BARBED WIRE NAILS  
 PLAIN WIRE STAPLES  
 CABLE WIRE STRETCHERS

**INDIANA WIRE FENCE CO.,**

Crawfordsville, Ind.

**CHAMPION IRON  
 COMPANY.**



The largest Iron Fence and Railing Works in the U. S.  
**KENTON, OHIO.**

**COBB & DREW,**  
 PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass  
 and Copper Rivets, Burrs, Washers,  
 D. P. Tacks and Staples.

New York Agency, James S. Hender-  
 son, successor to Disosway &  
 Henderson, Hardware.

Agents for Philadelphia Star Carriage  
 and Tire Bolts.



# CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

**Perforated Metals.** GALVANIZERS AND TINNERS OF **Wire Cloth and Nettings.**

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street.

## The Gilbert & Bennett Mfg. Co.

— MANUFACTURE —

**WIRE CLOTH, NETTING,**

Fencing, Gates, Fencing Tools,

**Wire Goods, Wire Work**

Stable Fixtures, Railings, Window Guards.

WIRE LATHING WITH HAMMOND'S METAL FURRING.

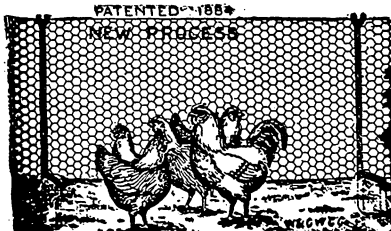
Pearl Window Screen Wire Cloth.  
Galvanized Steel Wire Cloth.  
Galvanized Wire Poultry Netting.  
"Cottage" Lawn & Garden Fencing.  
"C. & B." Web Wire Fencing.  
Sieves, Riddles, Screens.  
Gilbert's Rival Ash Sifters.  
House Furnishing Wire Goods.

44 Cliff Street,  
**NEW YORK.**

148 Lake Street,  
**CHICAGO.**

Factories, { GEORGETOWN, CONN.  
CHICAGO, ILLINOIS.  
ESTABLISHED 1818.

## WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



HARD STEEL WIRE

NEW PROCESS

**HARD STEEL WIRE CLOTH AND NETTING**

GALVANIZED

**WIRE NETTING.**

Painted Window Screen Wire Cloth,

Patented March, 1884.

Patents Pending.

WIRE LATHING, HOUSE FURNISHING WIRE GOODS.

SEND FOR LATEST CATALOGUE.

**OFFICE**  
233-235 ARCH. ST.

PENNSYLVANIA GALV'D POULTRY NETTING,  
CORTLAND PAINTED WINDOW SCREEN WIRE  
CLOTH, ADJUSTABLE WINDOW SCREENS, BRASS  
AND IRON GRILLES, WROUGHT IRON RAILINGS,  
AND WINDOW GUARDS; BRASS, COPPER, STEEL AND  
IRON WIRE CLOTH: GALVANIZED WIRE CLOTH.  
CORRESPONDENCE SOLICITED.

**WIRE WORKS**  
PHILADELPHIA, PA.

EDWARD DARBY & SONS.—PENNSYLVANIA

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS

**THE ROEBLING  
STANDARD  
WIRE  
LATHING.**

**NEW JERSEY  
WIRE CLOTH CO.**

**"JERSEY"  
POULTRY  
NETTING  
AND FARM  
FENCING.**

TRENTON,  
NEW JERSEY.

117 and 119 LIBERTY STREET,  
NEW YORK.

171 and 173 LAKE STREET,  
CHICAGO.

25 and 27 FREMONT STREET,  
SAN FRANCISCO.

**2 STAVE NAIL KEG** Stock

Manufactured by  
**CRESCENT MFG. CO.,**  
DETROIT, MICH.



Perforated Filter  
Press Plates.



BRONZE SCREEN PLATES  
To withstand action of  
ACIDULATED WATERS.

## THE HARRINGTON & KING PERFORATING CO. CHICAGO.

PERFORATORS OF STEEL, IRON, COPPER, ZINC, BRASS AND TIN.

GRAIN CLEANING AND MINING MACHINERY,  
WOOLEN, COTTON, PAPER AND PULP MILLS,  
RICE, FLOUR AND COTTON SEED OIL MILLS,  
SUGAR AND MALT HOUSES,  
DISTILLERIES, FILTER PRESSES,

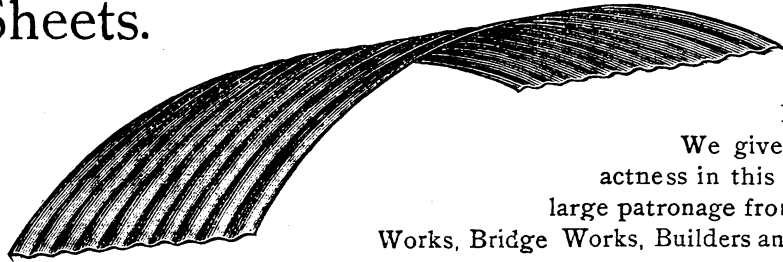
FOR USE IN

STONE, COAL AND ORE SCREENS,  
BRICK AND TILE WORKS, FILTERS,  
SPARK ARRESTERS, GAS AND WATER WORKS,  
OIL, GAS AND VAPOR STOVES,  
COFFEE MACHINERY, ETC., ETC.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A. Eastern Office, No. 284 Pearl St., New York.

## Curved Roofing Sheets.



Our little book  
"The Life of an Iron Roof,  
or How Long Will It Last?"  
sent free.

Made of Iron or Steel.

We give special attention to ex-  
actness in this kind of work and have a  
large patronage from the leading Arch. Iron  
Works, Bridge Works, Builders and Contractors.

The Cincinnati Corrugating Co.,

Box 312, Piqua, Ohio.

Stable  
Fixtures,  
Fire  
Escapes,  
Window  
Guards,  
Weather  
Vanes.

Send for  
Catalogue.

Detroit, Mich.

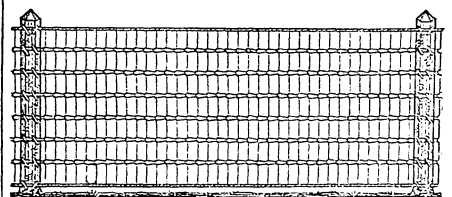
Write for  
Prices.

Jail  
Cells,  
Bank and Office  
Railing,  
Iron Stairs  
and Columns.

Mention this  
paper.



## RANDALL WOVEN WIRE FENCING.



A wire cable on each edge. Always taut. When erected every wire is properly strained, takes its permanent position and sustains every wire attached to it. There are no bulges, sags, ruffles or puckers to take out or guard against in straining. Send for circulars. Address

RANDALL FENCE CO., Le Roy, N. Y.

**SPECIAL** Particular attention given to  
production of goods adapted to  
special lines of business. Dupli-  
cating samples a specialty.

**WIRE**

**TACKS**

and

**NAILS.**

**Taunton Wire Nail Co.,**

**Taunton, Mass.**

The Prospector's Field-Book and Guide in the Search for and the Easy Determination of Ores and other Useful Minerals. By Prof. H. S. OSBORN, LL.D. EXTRACT FROM THE PREFACE: In the following pages we have attempted to present such a view of the whole subject of prospecting for the useful minerals that any liberally educated reader may fully comprehend our meaning. We have therefore explained special terms where we have thought it convenient to use them, and where the technically educated student would not need an explanation. The table of contents and index have both been carefully prepared, and being very full, will make reference to any subject in the volume easy and satisfactory. 44 engravings. 175 pages \$1.50

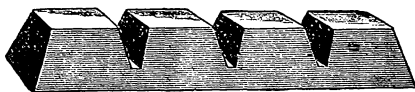
For Sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.

## SYRACUSE SMELTING WORKS.

—MANUFACTURERS OF—

## Highest Grades Anti-Friction Metals FOR ALL MACHINERY BEARINGS.

Dealers in Block Tin,  
Lead, Antimony, Alu-  
minum, Phosphor Tin,  
Copper and Brass Ingots,  
Refined Spelter.



Also several grades of  
Solder, Stereotype and  
Needle Metals.

All Kinds of Brass, Bronze and Babbitt Castings made on short notice.

OFFICE AND WORKS:

243 & 245 West Onondaga St., Syracuse, New York.

All metals manufactured by us are warranted to be as represented. Give us a trial and you will use no other metal but ours. Special discounts given to jobbers and large consumers.

CRIMPED  
STEEL  
WIRE

# LAWN FENCES

TREE GUARDS and SETTEES, CHEAPER THAN WOOD.

McCALLIP FENCE AND WIRE WORKS, Columbus, Ohio.

**ATLAS TACK CORPORATION.****508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

BRANCHES: **DUNBAR, ROBERT & CO., WHITMAN, MASS.** ESTABLISHED IN 1810. **CONSOLIDATED 1891.** **LORING & PARKS, PLYMOUTH, MASS.** ESTABLISHED IN 1842. **TAUNTON TACK CO., TAUNTON, MASS.** ESTABLISHED IN 1854. **AMERICAN TACK CO., FAIRHAVEN, MASS.** ESTABLISHED IN 1867. **OLD COLONY RIVET CO., PLYMOUTH, MASS.** ESTABLISHED IN 1866.

**MANUFACTURERS OF**

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York Store and our factories.

**MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.****BRANCH OFFICE & WAREHOUSE, 31 WARREN ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 239 & 241 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 406 COMMERCE ST., PHILADELPHIA, PA.****BRANCH OFFICE & WAREHOUSE, 14 WEST GERMAN ST., BALTIMORE, MD.**

Tacks, Nails, Wire Nails, Hoop Nails, Staples, Double Pointed Tacks, Lining and Saddle Nails, Siding and Roofing Nails.

**BONNIE BLUE TACKS.**  
100 Kegs in a Box,  
Assorted 3 to 12 oz.  
Retails 2 Kegs for 5 cents.

**PARISIAN GILT NAILS.**  
20 papers in Carton.  
5 cent seller.

**MONARCH WOOD KEG CARPET TACKS.**  
5 cent seller.

**"JUST ENOUGH"**  
Brass Nails. 100  
Nails in a Paper, just  
enough to tap a pair  
of shoes; 20 papers in  
Carton. 5 cent seller.

**DOUBLE ENOUGH**  
Cobblers' Nails. 200  
Nails in a Paper, 20  
Papers in Carton. 5  
cent seller.

**BILL NYE BRAD BOX.**

168 Papers Wire Brads, assorted  $\frac{1}{2}$  to  $\frac{3}{4}$  in. Each Paper just right to retail for 5 cents.

**NEW YORK OFFICE, 4 WEST BROADWAY.**

QUARTER SIZE CUT OF

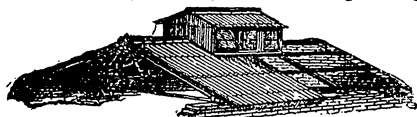


**GRAND CROSSING,**  
**CHICAGO, ILL. U.S.A.**

**The New York Iron Roofing and Corrugating Co.**

Finest and Largest Variety of Sheet Metals. Products manufactured in the U.S. **FIRST & WASHINGTON STS. JERSEY CITY, N.J.**

Corrugated, Crimped and Clap-Board Iron Roofing &amp; Siding



Iron Buildings, Roofs, Doors, Shutters, Cornices, Skylights, Bridges, &c.

**MOSELEY IRON BRIDGE AND ROOF CO.**  
Office 5 Day Street, Room 13. NEW YORK.

**The Metal Worker's Handy-Book**  
OF RECEIPTS AND PROCESSES,

BEING A COLLECTION OF CHEMICAL FORMULAS AND PRACTICAL MANIPULATIONS FOR THE WORKING OF ALL THE METALS AND ALLOYS, INCLUDING THE DECORATION AND BEAUTIFYING OF ARTICLES MANUFACTURED THEREFROM, AS WELL AS THEIR PRESERVATION.

Edited from Various Sources by

**WILLIAM T. BRANNT.**  
500 Pages, Cloth, \$2.50.

**THE TECHNO-CHEMICAL RECEIPT BOOK.**

CONTAINING

SEVERAL THOUSAND RECEIPTS, COVERING THE LATEST MOST IMPORTANT AND MOST USEFUL DISCOVERIES IN CHEMICAL TECHNOLOGY, AND THEIR PRACTICAL APPLICATION IN THE ARTS AND THE INDUSTRIES.

Edited from the German with Additions by

**WILLIAM T. BRANNT.**  
495 Pages, Cloth, \$2.00.

Sent post-paid on receipt of price, by

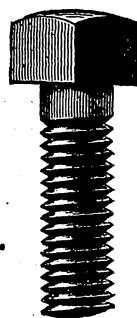
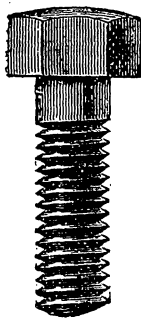
**DAVID WILLIAMS, Publisher & Bookseller,**  
96-102 Rende St., New York.

**REYNOLDS & CO.**

MANUFACTURERS OF

**SET, CAP AND MACHINE SCREWS,**

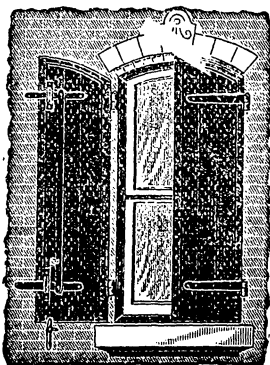
Studs, Coupling Bolts, Stove Bolts, Finished Nuts, &amp;c.



Also Hand and Draw-plate Moulding Machines for Foundry Use.

**NEW HAVEN, CONN.**

SEND FOR CATALOGUE.



Mention The Iron Age,

**PROTECT**

Your Offices, Stores and Warehouses from fire and burglars by using

**Metallic Doors and Shutters**

Made from wood and covered with iron or steel, rendering them stiff and preventing warping in case of fire.  
Made from heavy boiler plate iron.  
Made from double corrugated iron or steel.  
Made to fit any size opening.

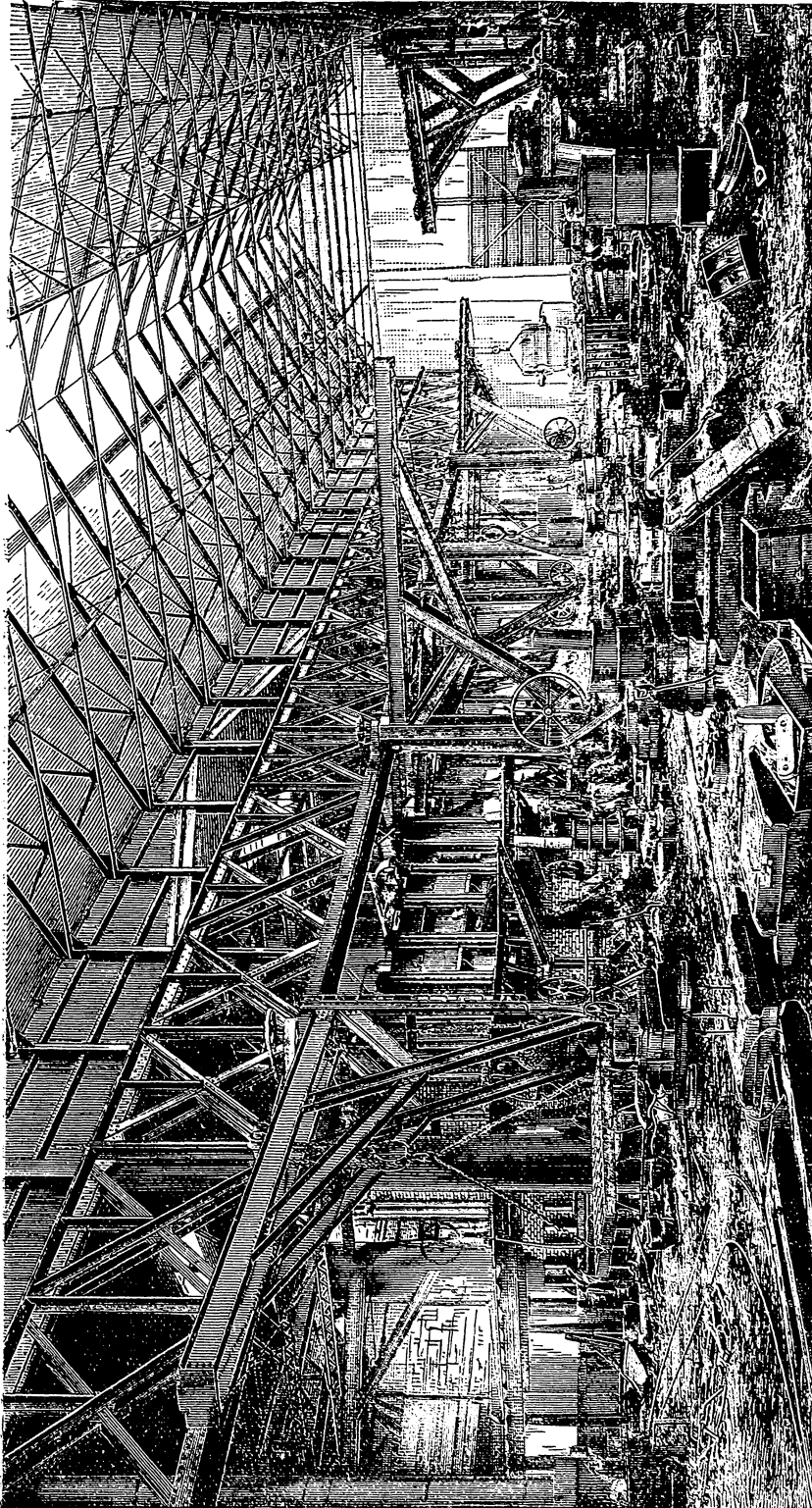
Estimates furnished upon application.

**GARRY IRON & STEEL ROOFING CO.,**  
**CLEVELAND, OHIO.**

# The Berlin Iron Bridge Co.,

Engineers, Architects and Builders in Iron and Steel.

**Office and Works, - East Berlin, Conn.**



The above illustration is taken direct from a photograph and shows the interior of an Iron Foundry designed and built by us for The Farrel Foundry & Machine Co., at Ansonia, Conn. The building is 129 ft. in width by 302 ft. in length. The wings are 30 ft. and 43 ft. respectively, and the central portion is 56 ft. in width. The central portion of the building is controlled by a hydraulic crane, with a travel the full length of the building, and is also arranged with jib cranes for delivering the material from the traveling crane to the cranes in the wing trusses.

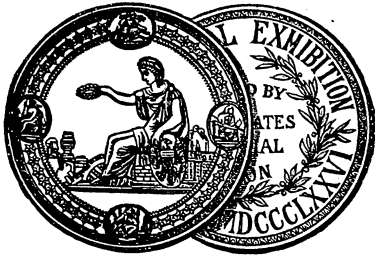
**SEND FOR ILLUSTRATED CATALOGUE.**

CHAS. M. JARVIS,  
*Pres. and Chief Engineer.*

BURR K. FIELD,  
*Vice-President.*

GEO. H. SAGE,  
*Secretary.*

F. L. WILCOX,  
*Treasurer*



U. S. CENTENNIAL EXHIBITION  
1876



METROPOLITAN MECHANICS INSTITUTE



UTICA MECHANICS ASSOCIATION  
1856



FRANKLIN INSTITUTE  
1856



AMERICAN INSTITUTE  
1855



WORLD'S FAIR, N.Y.  
1853



AMERICAN INSTITUTE  
1841

ESTABLISHED 1838.

**American Screw Company,**

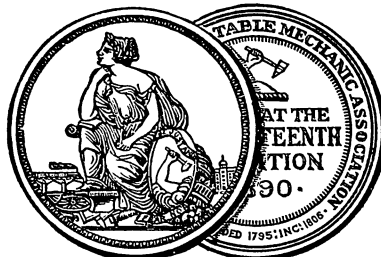
Providence, Rhode Island.

Has Received an Award at the  
**World's Columbian  
Exposition**

For Wood AND Machine Screws,  
Bolts and Rivets.



AMERICAN INSTITUTE  
1891



MASS. CHARITABLE MECHANIC ASS'N  
1890



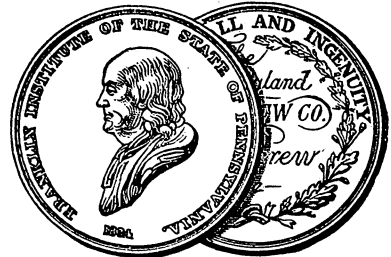
EXPOSITION UNIVERSELLE  
PARIS, 1889



MIDDLESEX MECHANIC ASSOCIATION  
1854



HARTFORD CO. AGRICULTURAL SOCIETY  
1842



FRANKLIN INSTITUTE  
1842



MASS. CHARITABLE MECHANIC ASS'N  
1844



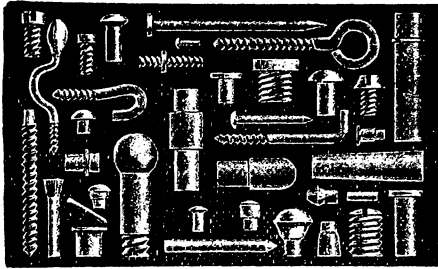
AMERICAN INSTITUTE  
1847



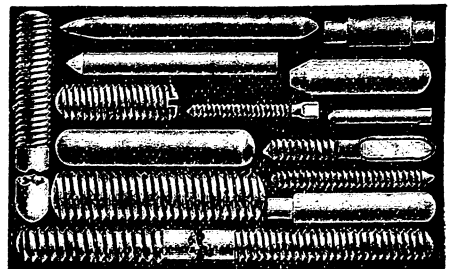
WORCESTER CO. MECHANICS ASS'N  
1849



MASS. CHARITABLE MECHANIC ASS'N  
1850



**Iron and Brass Rivets,  
STUDS, PINS,  
SCREWS, &c.,**  
For Manufacturers of Light Hardware.  
**BLAKE & JOHNSON,**  
WATERBURY, CONN.



# NEW CASTLE WIRE NAIL CO.,

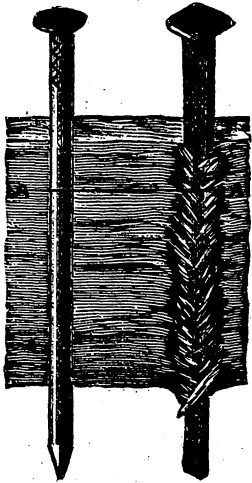
MANUFACTURERS OF



**WIRE RODS AND WIRE.**

Office and Works,

**NEW CASTLE, PA.**



## THE SALEM WIRE NAIL CO.

—MANUFACTURERS OF—

**STEEL WIRE NAILS, FENCE STAPLES,  
ANNEALED and GALVANIZED WIRE.**

Works: SALEM, O ; FINDLAY, O.

General Office : - SALEM, OHIO.

BRANCH OFFICES :

Room 32, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

Osgood & Howell, 132 Market St., San Francisco, Cal.

## THE BOND NAIL.



These nails are made from different sizes of wire with head at any desired position between the points. For coopers, box and furniture manufacturers' dowels, they are unsurpassed. Builders and repairers of all kinds will find these nails useful. We also manufacture Doweling Machines and Sets for driving these nails. Address

**THE BOND NAIL CO.,**

P. O. Box 23,

**RAYNHAM, MASS.**

**BORDEN & LOVELL,**

**70 AND 71 WEST STREET,  
NEW YORK.**

**Steel, Iron and Wire Nails.**

**We Give** \_\_\_\_\_

**Better Value**

... IN ...

**Brass Shoe Nails,**

As we carefully sift and assort them, so that all the dust and imperfect nails are removed.

**Prices no Higher. Prompt Shipments.**

**CLENDENIN BROS., Baltimore, Md.**

THE CELEBRATED

**"SILVER FINISH"**

**GALVANIZED POULTRY NETTINGS.**

FOR SALE BY THE HARDWARE TRADE.

GET THE BEST



FRANKLIN S. MILES,

Manufacturer of

Brass, Iron, Steel and German Silver

**SCREWS,**

205 Quarry St., Philadelphia.

**Electric Traction on Railways and Tramways.** By A. BEEKENZAUN. The author has endeavored in this book to summarize as concisely as possible the present state of electric traction and to describe the various methods and constructive details which are to-day in use or which have marked consecutive steps in the development of the art. 213 illustrations, 12mo, cloth.....\$4.00

For sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.



## Standard Books

—ON—

## FOUNDRY PRACTICE.

## The Practical Brass and Iron Founder's Guide.

A treatise on brass founding, molding, the metals and their alloys, etc. By JAMES LARKIN, late conductor of the brass foundry department in the Penn Works, Philadelphia. A new revised and greatly enlarged edition. Contents: Among the most important and entirely new sections of this edition of this valuable and popular book are the following: Behavior of Metals and Alloys in Melting and Congealing; Malleable Iron Castings; Wrought Iron or Mite Castings; Manufacture of Steel Castings; Casting of Brass; Casting of Bronze; Bell Founding; Chill Casting; Casting without Core; Casting on to other Metals; Casting Iron and other Metals upon Lace, Embroideries, Fern leaves and other Combustible Materials; Some Modern Bronzes. In one volume; 12mo; 400 pages.....\$2.50

## American Foundry Practice.

Treating of loam, dry sand and green sand molding, and containing a practical treatise upon the management of cupolas and the melting of iron. By THOMAS D. WEST, practical iron molder and foundry foreman. Fully illustrated. Eighth edition revised. 408 pages; cloth.....\$2.50

## Molder's Text Book,

being Part II of American Foundry Practice. A practical treatise on molding, discussing the question of economy in casting and the arrangement of a foundry in regard to rapid work. Treating of cupolas, methods of firing, best means of securing perfect and sound castings, &c., being a continuation of Vol. I on this subject, and dealing with a class of work requiring more skill and greater care. By THOMAS D. WEST. With numerous illustrations. Fifth edition. 481 pages; cloth.....\$2.50

## Modern Molding and Pattern Making.

A practical treatise upon pattern shop and foundry work. By JOSEPH P. MULLIN, M.E.; 287 pages; cloth; illustrated.....\$2.50

## The Pattern Maker's Assistant

Embracing lathe work, branch work, cone work, sweep work and practical gear constructions, the preparation and use of tools, together with a large collection of useful and valuable tables. Sixth edition. By JOSHUA ROSE, M. E.; illustrated with 25 engravings; 324 pages; cloth.....\$2.50

## Iron and Steel Founding.

Illustrated with 39 diagrams. By C. WYLLIE. Second edition, revised and enlarged; 324 pages; 8vo; cloth.....\$3

## Practical Iron Founding.

A condensed account of the principles and practice of iron founding, both for the student and for the practical man, with principles stated and explained, and including the most recent practice, particularly as it relates to the two branches of machine molding and the melting of iron. Cloth; illustrated with over 100 engravings.....\$1.50

## Founding of Metals.

A treatise on the melting of iron, with a description of the founding of alloys, also of all the metal and mineral substances used in the art of founding. Collected from original sources. A practical guide for the construction and management of foundry cupolas and furnaces. Fifth edition. By EDWARD KIRK; 272 pages; cloth.....\$2.50

Sent, Postpaid, on receipt of price, by

DAVID WILLIAMS,

Bookseller and Publisher,

96-102 Reade St., - New York.

## Gautier Steel Department of Cambria Iron Co.,

JOHNSTOWN, PA.

—: MANUFACTURERS OF:—

## MERCHANT BAR STEEL:

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

## AGRICULTURAL STEEL AND SHAPES:

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

## PLOW STEEL:

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

## COLD ROLLED STEEL SHAFING.

## STEEL HARROW DISCS.

## CAMBRIA LINK BARB WIRE.

New York Office,  
102 Chambers St.

Philadelphia Office,  
S. W. Cor. 5th & Commerce Sts.

Chicago Office,  
209 Phenix Building.

Southern Office,  
Chattanooga, Tenn.

**THE CAMBRIDGE IRON & STEEL CO.**  
MANUFACTURERS OF

**GALVANIZED SHEET IRON**

TRADE MARK

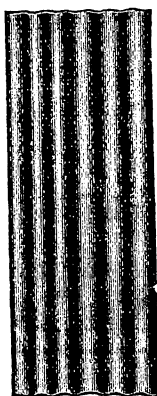
BLACK SHEETS FOR ROOFING & CORRUGATING

PICKLED & COLD ROLLED FOR STAMPING

CAPACITY RANGES FROM NO. 30 26 INCHES WIDE TO 4'x40'x20'

CORRESPONDENCE SOLICITED

OFFICE & WORKS CAMBRIDGE, OHIO.



## THE JERSEY CITY GALVANIZING CO.,

MANUFACTURERS AND JOBBERS IN

## Galvanized Material of Every Description.

Plain, Painted or Galvanized Corrugated Sheet Iron

## Siding, Roofing, Ceiling, &amp;c., &amp;c.

Galvanized and Plain Steel and Iron Sheets, Bars, Hoop and Band Iron, Nails, Spelter, Lead, Tin, &c.

## GENERAL GALVANIZING TO ORDER.

65, 67 & 69 Bay St., and 68, 70, 72, 74 & 76 Morgan St., Jersey City, N. J.  
Store and Office, 112 John St., opposite Cliff St., New York.

**STEEL ROOFING**  
CORRUGATED IRON EAVE TROUGH  
CONDUCTOR PIPE ROOF PAINTS ETC.

CORRESPONDENCE SOLICITED

THE CAMBRIDGE ROOFING CO. CAMBRIDGE, OHIO.

**THE KANNEBERG ROOFING CO.** CANTON, O.  
MFR'S OF THE KANNEBERG PAT.  
LATEST IMPROVED FOLDED LOCK SEAM STEEL ROOFING.

ORIGINATORS OF GENUINE STEEL ROOFING.

CORRUGATED & CRIMPED IRON ROOFING SIDING & CEILING EAVE-TROUGH CONDUCTOR PIPE &c.

WRITE FOR CATALOGUE & PRICE LIST



# Lukens Iron <sup>AND</sup> Steel Co. INCORPORATED 1890.

The First to make Boiler Plates in America.

Chas. Huston, Pres. A. F. Huston, Vice-Prest. C. L. Huston, Genl. Mgr. Robt. B. Haines, Jr., Secy. Jos. Humpton, Treas.

## STEEL AND IRON PLATES, ALSO SHEETS

TO EXTREME DIMENSIONS.

WIDTHS UP TO 10 FEET.

THICKNESS, No. 12 GAUGE TO 1 1/4 INCHES.

—ESTABLISHED 1810.—

WORKS:

NEW YORK OFFICE:

PHILADELPHIA OFFICE:

Coatesville, Pa.

No. 29 Broadway.

62 & 64 Bullitt Bldg.

FRANK SAMUEL,  
136-138 So. 4th St.,  
Philadelphia.

# LOW PHOSPHORUS

PIG IRON—.03 or under.  
SCRAP—.03 or .05 or under.  
ORE—For O. H. and Furnace Use.  
MELTING BAR—  
Open Hearth and Bessemer Billets,  
Skelp, Muck Bars and Scrap, Foundry  
and Bessemer Pig Iron.  
Syracuse Tube Co.'s Tubes and Pipe.

## THE PHOENIX IRON CO., 410 Walnut St., Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

### WROUGHT IRON AND OPEN HEARTH STEEL.

Beams, Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.

SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes,

Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS.; JAMES B. STOKES, 132 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. SMITH, 931 The Rookery, CHICAGO.

## POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.,

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

## STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

## TESTED CHAINS.

## BRADLEE & CO., - EMPIRE CHAIN WORKS,

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging, Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

## High Grade Tested Chains.

### JAMES MCKAY & CO.,

29TH & LIBERTY STREETS,

PITTSBURGH, PA.

Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

### BARCLAY W. COTTON & CO.,

Successors to ESHERICK, COTTON & CO.,

Iron and Steel Merchants.

AGENTS FOR

"Continental" Corrugated Furnaces.

418 Walnut St., PHILA.

MIFFLIN WHEELER.

G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,  
216 South Third St., Philadelphia, Pa.

—DEALERS IN—

IRON AND STEEL SCRAP.

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.,  
Steel and Iron Plates, New and Old Rails.

CRESCENT  
STEEL

## CRESCENT STEEL CO.

480 PEARL ST.  
NEW YORK

PITTSBURGH, PA.

64 & 66 S. CLINTON ST.  
CHICAGO.

## EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS.

BEAMS, CHANNELS,  
ANGLES, TEES, PLATES,  
RIVETED GIRDERS.

## IRON AND STEEL,

BARS, BANDS, HOOPS,  
BOLTS, NUTS, RIVETS,  
ROOF TRUSSES.

29 BROADWAY,  
NEW YORK.

421 CHESTNUT ST.,  
PHILADELPHIA.

70 KILBY ST.,  
BOSTON.

OUR OFFICES AND MILLS ARE CONNECTED BY TELEPHONES.

**EDWARD J. ETTING,**  
IRON BROKER & COMMISSION MERCHANT  
222 S. THIRD ST., PHILADELPHIA, PA.  
Pig, Bar and Railroad Iron, Old Rails, Scrap.  
AGENT FOR THE  
**MOUNT SAVAGE FIRE BRICK,**  
Eastern Penna., West New Jersey and Delaware.  
**Agent TRENTON IRON CO.,**  
For the Sale of Wire and Wire Rope.  
Longdale (Va.) and other Pig Irons.  
STORAGE YARD, Pier No. 57 South (old Navy Yard)  
which is connected with Penn. R. R. and its various  
connections. Negotiable Warehouse Receipts issued.  
CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.  
**JEROME KEELEY & CO.,**  
The Philadelphia Bank Bldg., 421 Chestnut St.,  
PHILADELPHIA.  
**Foundry, Forge Pig Irons,**  
**Iron Ores, Coke, Coal,**  
**Steel Blooms, Billets, Rails, etc.**  
**Muck Bars, Blooms, Scrap Iron.**  
Consulting Engineers in Metallurgy and Mining.

**JUSTICE COX, JR.,**  
218 South 4th St., Phila., Pa.  
**IRON and STEEL.**  
— AGENT FOR —

Haldeman, Grubb & Co's.  
Chickies Bessemer Pig Iron.  
Mahoning Rolling Mill Co.'s  
Best Quality Skelp Iron and Steel.  
Pulaski Iron Co.'s  
High Grade Foundry and Forge Pig Iron.  
Hainsworth Steel Co.'s  
Standard Bessemer Steel Billets.  
Bars, Angles, Sheets, Tank and Bridge  
Plates, Muck Bars, Blooms, Scrap Iron  
and Tool Steel.

**J. W. HOFFMAN & CO.,**  
Bullitt Building, 135 So. 4th St., Philad'a,  
**Iron and Steel Merchants.**  
**PIG IRON,**  
Iron and Steel Plates, Sheets, Bars and Shapes. Rails  
Cars and Locomotives. Track Equipment.  
CORRESPONDENCE SOLICITED.

**JOHN L. HOGAN & CO.,**  
IRON COMMISSION MERCHANTS,  
Bullitt Building, 135 South Fourth St., Phila.  
**Agents for Brier Hill, Lehigh, Struthers**  
**AND MUIRKIRK PIG IRON,**  
Delaware Rolling Mill, muck bars, Youngstown Steel  
Co., Connellsville Coke.

**W. H. THOMSON & CO.,**  
Dealers in  
**IRON and STEEL and**  
**other METALS**  
FOR ALL PURPOSES,  
Room 259, Bullitt Building,  
PHILADELPHIA, PA.

C. B. Houston. J. Max Bernard. H. H. Houston.  
**C. B. HOUSTON & CO.,**  
Bullitt Building, PHILADELPHIA.  
Pig Iron, Coal, Coke, Steel Rails, Structural  
Iron, Steel Castings and Fire Brick.  
Sole Agents for Paxton Rolling Mills.  
**STEEL AND IRON PLATES.**

**FRANCIS WISTER**  
COMMISSION MERCHANT,  
**Coke, Coal, Ores.**  
PEA AND BUCKWHEAT (Red and White Ash).  
National Foundry Coke a Specialty. Sulphur less  
than 0.5.  
All Sizes National Crushed Coke.  
420 Walnut Street, PHILADELPHIA.

W. S. PILLING.

T. J. CRANE

**PILLING—AND—CRANE.**  
**IRON ORES:** Lake Superior, Foreign, Concentrates,  
Magnetic and native Self-fluxing.  
**PIG IRON:** Low Phosphorus, Open-hearth, Bessemer  
and other grades.  
**STEEL:** In Blooms, Slabs and Billets, and scrap.  
**COKE:** For Furnace and Foundry use.  
BULLITT BUILDING, 141 S. FOURTH ST., PHILADELPHIA.

**ALAN WOOD COMPANY,**  
MANUFACTURERS OF  
Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,  
**PLATE & SHEET IRON.**  
ALSO LIGHT PLATES AND SHEETS OF STEEL,  
No. 519 Arch Street, Philadelphia, Pa.  
Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack,  
Tank and Boat Iron; Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

**J. J. MOHR,**  
Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.  
—SOLE AGENT FOR—  
Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-  
DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.  
Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

**JAMES G. LINDSAY & CO.**  
BULLITT BUILDING, 133 South Fourth St., PHILA.  
**IRON and STEEL STRUCTURAL MATERIAL**  
For all purposes. Estimates Furnished for Iron and Steel Structures.

**We Manufacture Machine Screws.**

Electric and Chandler trade a specialty.  
**NEW ENGLAND SCREW CO.,** 14 Mt. Washington Ave.  
BOSTON, MASS..

**EDITION FOR 1894.**  
**DIRECTORY**

— OF THE —

**Iron and Steel Works**  
OF THE UNITED STATES.

Embracing a complete list of the Blast Furnaces, Rolling  
Mills, Steel Works, Forges and Bloomeries in every State and  
Territory; also Wire Mills, Wire Nail Works, Car Axle Works,  
Car Wheel Works, Car Builders, Locomotive Works and Cast  
Iron Pipe Works and Wrought Iron Pipe Works, Tin Plate  
Works, Rod Mills, Cut Nail Works, Shipbuilding and Bridge-  
building Works. 304 pages, cloth.

Published by The American Iron and Steel Association.

**PRICE, - - - \$5.00.**

Sent on receipt of price by

**DAVID WILLIAMS,** - Publisher and Bookseller,  
96-102 Reade Street, NEW YORK.

# FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,  
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" **(XX)** Extra Best and "Warranted Best"  
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "NELSON" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.  
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD.

CRUCIBLE CAST STEEL.

ABBOTT, WHEELOCK & CO., Agents and Importers of

**SWEDISH IRON,**

85 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

## S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand **"TOUGH"** Cast Steel for Leather Splitting and Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St., New York.

Frank S. Pilditch, Agent.

CARLISLE **KAYSER, ELLISON & CO.,** SHEFFIELD, ENGLAND  
WORKS,

Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

31 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Cor-  
set Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

## JESSOP'S STEEL

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

OF Best Quality,  
IN Bars, Sheets AND Plates.

Large assortment of sizes in stock at

91 John St., - - - NEW YORK.

And other Agencies.

SHEFFIELD,  
ENGLAND.

Gold Medal Paris,  
1889.

## WIRE

DRAWING

WORTLES, PLATES and JEWEL DIES.

## DIES

NEWTON & SHIPMAN,

83 John St., - New York.

Stay-Bolt,  
Rivet, D. Link,  
Axe, Hatchet,  
Carriage and  
Wagon Axle

**IRON.**

Superior Quality Refined Bar Iron  
"VULCAN" AND "LOCKHART" BRANDS.



SMALL CHANNELS AND ANGLES,  
HEXAGON IRON AND STEEL.

All  
Merchant Bar  
Sizes  
of  
Soft  
**STEEL.**

Coal Mining for the Use of Colliery Man-  
agers and others. By HERBERT W. HUGHES.  
In the preparation of this work the author's aim  
has been to supply a text-book containing all the  
information with which the student and the prac-  
tical miner should be familiar. The details of gen-  
eral colliery work are fully described, and at the  
end of each chapter is given a carefully selected  
list of memoirs, in which fuller information can be  
sought. CONTENTS: Geology; Coal; Search for Coal;  
Breaking Ground; Sinking; Preliminary Oper-  
ations; Methods of Working; Haulage; Winding;  
Pumping; Ventilation; Lighting; Works at Sur-  
face; Preparation of Coal for Market. 8vo, cloth.

For sale by DAVID WILLIAMS, 96-102 Reade St. N.Y. \$6.00

# CAMBRIA STEEL,

Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings

BESSEMER AND OPEN-HEARTH BLOOMS, BILLETS AND BARS.

Steel Axles, Steel Angles, Steel Channels, Steel Forgings.

## CAMBRIA IRON COMPANY,

Office, 218 S. Fourth St., Philadelphia.  
Chicago Office, Phoenix Building.  
(WORKS AT JOHNSTOWN, PA.)

**A. & P. ROBERTS & COMPANY,**  
Pencoyd Iron Works, | Pencoyd Bridge & Construction Co.,  
MANUFACTURERS OF | DESIGNERS AND MANUFACTURERS OF  
Wrought Iron and Open Hearth Steel, | Bridges, Viaducts, Turn Tables, Etc.  
OFFICE: 261 S. 4th Street, PHILADELPHIA, Pa. | WORKS, PENCYD, PA.

E. H. Wilson. A. Kaiser. J. B. M. Hiron.  
**E. H. WILSON & CO.,**  
222 and 224 South Third St., Philadelphia  
BROKERS AND DEALERS IN  
**IRON AND STEEL.**  
Correspondence solicited.

**PIERSON & CO.,**  
—DEALERS IN—  
**IRON and STEEL**  
OF EVERY DESCRIPTION,  
29 Broadway, cor. Morris St.,  
NEW YORK.

**A. R. WHITNEY & CO.,**  
MANUFACTURERS AND DEALERS IN  
**IRON and STEEL.**

AGENCIES:  
CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.  
PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.  
BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.  
RIVERSIDE IRON WORKS, Steel Pipe.  
GLASGOW TUBE WORKS, Boiler Flues.  
AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States. 25 in Europe and 100 in Canada.  
THE SEIDELL & HASTINGS CO., Charcoal Iron Boiler Plates.  
Plans and estimates furnished and contracts made for Iron and Steel Structures of every description. Please address  
P. O. Box 33. 29 Broadway, New York.

**NORTH BROTHERS MFG. CO.**  
**Iron and Brass Founders**  
*Light Castings a Specialty.*  
N. W. Cor. 23d and Race Streets.  
PHILADELPHIA.  
Correspondence solicited.

**AMERICAN**  
**PIC IRON STORAGE WARRANT CO.,**  
(Bank of America Building.) 44 Wall St., N. Y.  
Correspondence of Furnaces Invited.

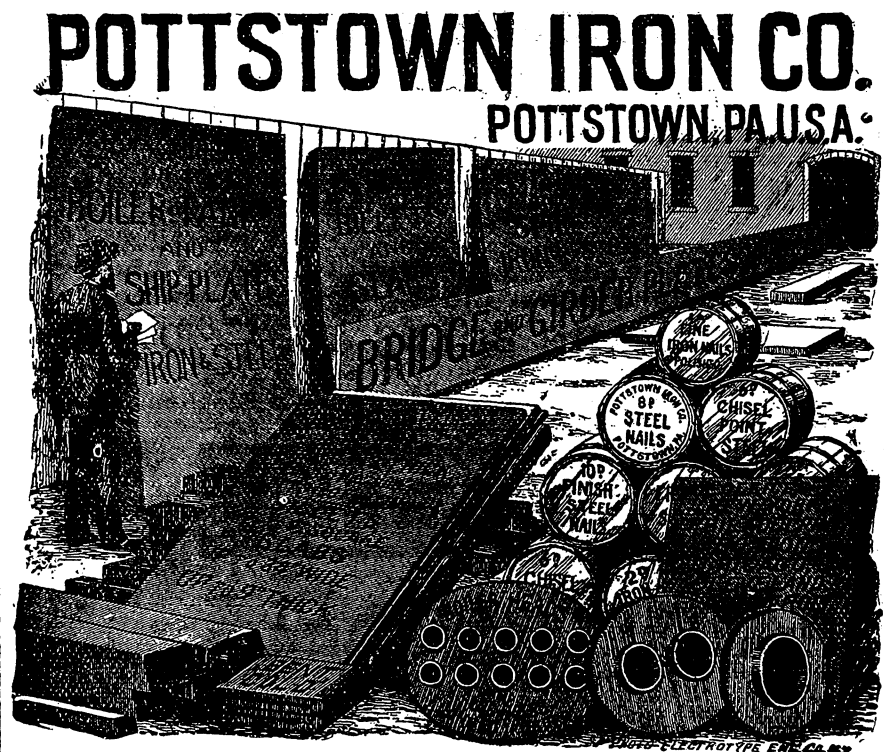


Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.

**CHROME STEEL WORKS,**  
Brookline, N. Y.

**A. MILNE & CO.,**  
**Swedish (Norway) Iron and Steel,**  
BLOOMS, BILLETS, BARS; WIRE, RIVET AND NAIL RODS.  
**FOREIGN AND DOMESTIC IRON AND STEEL.**  
1 Broadway, New York. 8 Oliver Street, Boston.

**GUSTAF LUNDBERG,**  
Agent for **N. M. HOGCLUND'S SONS & CO.** of Stockholm.  
**SWEDISH AND NORWAY IRON.**  
Bessemer and Open Hearth Steel.  
19 KILBY ST., BOSTON.



**FRANKFORD STEEL COMPANY.**  
FRANKFORD, PHILA., PA.  
**Steel Railroad and Machine Forgings,**  
SOLID CRUCIBLE STEEL CASTINGS  
AND  
Best Grades of Tool and Machinery Steel.

**ÆTNA-STANDARD IRON AND STEEL CO.,**Successors to **Ætna Iron and Steel Co., and The Standard Iron Co.,** Manufacturers of**PLATES and SHEETS, BLACK, GALVANIZED and CORRUGATED Plain Roofing, Siding and Ceiling, also of Sheet Steel, for special purposes, Cold Rolled or Plain and Patent Leveled.****BARS, LIGHT SECTION RAILS, ANGLES, TEES and CHANNELS, odd sections and sizes, Machine Straightened Steel Tire, Ordinary Shafting, Horse-Shoe Bars, Ax-Poll Steel, Toe Calk, Nut, Bolt and Chain Rods, and other special Bars suited to every requirement.****PROMPT SHIPMENT from STOCK.**Inquiries solicited. Stock List Mailed on Application. Address, **BRIDGEPORT, OHIO.****CARBON STEEL COMPANY, PITTSBURGH, PA.**

MANUFACTURERS OF

Universal Mill Plates.  
Sheared Plates and  
Sheets.Boiler, Ship and Armor  
Plates.

Also Nickel Steel Plates.

**LIST OF SIZES SENT UPON APPLICATION.****AGENCIES:****L. S. BOOMER, 647 The Rookery, Chicago, Ill.****GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.****BULLARD & POST, 125 Milk Street, Boston, Mass.****THE CONDIT-FULLER CO., Perry-Payne Building, Cleveland, O.****JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.****GEO. C. BEALS, Erie Co. Savings Bank Building, Buffalo, N. Y.****R. MUSHET'S  
"SPECIAL," STEEL "TITANIC,"**FOR  
LATHE AND PLANNER TOOLS.For Chisels, Taps, Dies, Chilled Roll  
Turning, Punches, &c., &c.

(The "Trade-Marks" of which are registered in the United States.)

MANUFACTURED ONLY BY

**SAMUEL OSBORN & CO.,** - - - **Clyde Steel & Iron Works, Sheffield, Eng.**

SOLE REPRESENTATIVES IN THE UNITED STATES,

**B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.****No. 143 LIBERTY STREET, NEW YORK.****FLINT & CO.,**

68 Broad St., New York,

**EXPORTERS**

-OF-

Rolling Stock, Rails and Railway Supplies  
of all kinds, Bar and Sheet Iron and  
Steel, Cast and Wrought Iron  
Pipe, Boiler Plates, Barb  
Wire, and all sorts of  
Steel and Iron Man-  
ufactures to**SOUTH AMERICA and WEST INDIES.****AGENCIES:**

Quayle, Davidson & Co.	- -	Rio de Janeiro.
Luis de Olazarra	- -	Havana.
Winfield S. Stern	- -	Valparaiso.
F. L. Crosby	- -	Lima.
E. Pavia	- -	Guayaquil.

Correspondence solicited from Manu-  
facturers interested in export.**The Practical Brass and Iron  
Founder's Guide.**A Treatise on Brass Founding, Molding,  
the Metals and their Alloys, etc.By **JAMES LARKIN.**Late Conductor of the Brass Foundry Department of  
the Penn Works, Philadelphia.**A New Revised and Greatly Enlarged Edition.****CONTENTS:**Among the most important and entirely new sections  
of this edition of this valuable and popular  
book are the following:Behavior of Metals and Alloys in Melt-  
ing and Congealing; Malleable Iron Cast-  
ings; Wrought Iron or Mitis Castings;  
Manufacture of Steel Castings; Casting of  
Brass; Casting of Bronze; Bell Founding;  
Chill Casting; Casting without Core;  
Casting on to other Metals; Casting Iron  
and other Metals upon Lace, Embroideries,  
Fern Leaves and other Combustible Ma-  
terials; Some Modern Bronze s.

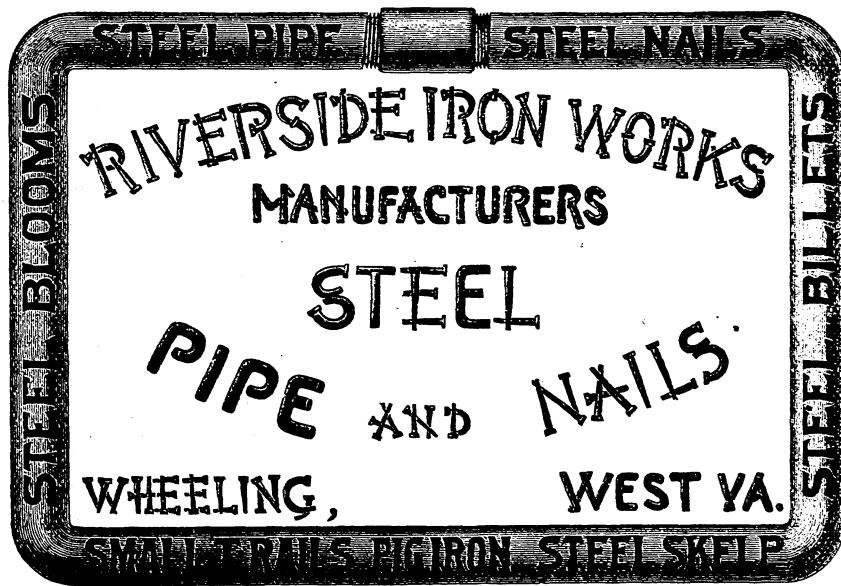
In one volume, 12mo, 400 pages, \$2.50.

Sent, postpaid, on receipt of price, by

**DAVID WILLIAMS,**

Bookseller and Publisher,

96 - 102 Reade Street, - New York.

**THE GARTLAND FOUNDRY CO.,**

MANUFACTURERS OF

Light Work our **Soft Grey Iron Castings.**

Specialty.

**UNION and ECHO STS.,  
Cleveland, Canton & Southern R. R.,**We are prepared  
to do Japanning and  
Galvanizing.**CLEVELAND, O.****JOHN H. RICKETSON, Prest.****A. G. BARNETT, Treas.****W. L. RICKETSON, Supt.****O. G. RICKETSON, Vice-Prest.****A. G. MCCLINTOCK, Sec'y.****A. GARRISON FOUNDRY CO.,**

Manufacturers of Sand, Patent Homogeneous Steel and

**CHILLED ROLLS.**Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings  
of every description.**Office: Nos. 10 & 12 Wood St., - PITTSBURGH, PA.**

ESTABLISHED IN 1848: **SINGER, NIMICK & CO., Ltd.** PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

Hammered and Rolled

**STEEL.**

Warranted Equal to any Produced.



**HIGH GRADE SPECIAL** Crucible Tool Cast Steel, for all purposes requiring the **very finest** quality.

**SINGER'S ANNEALED EXTRA** Crucible Tool Cast Steel, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an **extra fine** quality.

**BEST** Crucible Tool Cast Steel, for all purposes requiring steel of **Standard** quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.

**SAW STEEL**, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

**HOT ROLLED SHEET STEEL**, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.

**BRIGHT COLD ROLLED SHEET and STRIP STEEL**, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequalled finish and accuracy of gauge.

**ROUND MACHINERY STEEL**, for Shafting, Rollers, Spindles, &c., &c.

**AGRICULTURAL STEEL.**

"Iron Centre" Cast Plow Steel.

"Soft Steel Centre" Cast Plow Steel.

"Soft Steel Back" Cast Plow Steel.

"Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.

Crucible Cast Plow Steel.

Steel Rotary Harrow Discs.

Finished Rolling Plow Colters.

Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at **243 Pearl and 18 Cliff Streets, NEW YORK**, by

**HOGAN & SON, General Agents for Eastern and New England States.**

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston, and

W. E. STOCKTON, 16 & 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

**LA BELLE STEEL CO.,**

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa.

MANUFACTURERS OF ALL KINDS OF **STEEL** SPRINGS, AXLES, RAKE TEETH, Etc.

**WETHERELL BROS.,** EASTERN REPRESENTATIVES, 31 Oliver St., Boston, and 93 Liberty St. N. Y.

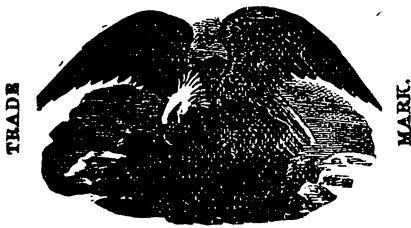
Canadian Agent, W. G. BLYTH, No. 76 York St., Toronto, Ont.

**J. TATNALL LEA & CO.,**

No. 125 So. Fourth St., Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIG IRON,  
MUCK BARS AND IRON ORES.**

**W. Dewees Wood Co.,**



MANUFACTURERS OF PATENT

**PLANISHED SHEET IRON**

PATENTS:

Dec. 10th, 1878. Mar. 4th, 1884. Aug. 31st, 1886.  
Jan. 10th, 1882. April 15th, 1884. Jan. 1st, 1889.  
Jan. 1st, 1884. June 10th, 1884. Jan. 17th, 1893.  
Feb. 12th, 1884. Jan. 6th, 1886.

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS

**McKEESPORT, PA.**

Branch Office: 111 Water Street, Pittsburgh, Pa

**Screws and Screw Making** With a Chapter on the Milling Machine; a complete treatise on Screw Making in all its branches, embracing most recent methods and containing the reports which originated modern standard screw threads. With 95 illustrations. 12mo, cloth.....\$1.25  
For Sale by David Williams, 96-102 Reade St., N. Y.

— SOHO IRON & STEEL WORKS —

**MOORHEAD & McCLEANE CO.**  
MANUFACTURERS OF  
**PLATE IRON & STEEL**  
**GALVANIZED SHEET IRON**  
**PLATES SPECIAL WIDE SHEETS AND EXTRA LONG SKELP IRONS**  
**PITTSBURGH.**  
CORRUGATED & ROOFING IRONS

OFFICES AND WORKS.  
EASTERN WAREHOUSE. No. 81 JOHN STREET. NEW YORK.  
WESTERN WAREHOUSE. Nos. 16 & 18 W. LAKE ST. CHICAGO.

**STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO.**

—HEADQUARTERS FOR—

**LIGHT GRAY IRON CASTINGS,**

—UNEQUALED IN—

**SOFTNESS and SUPERIOR FINISH.**



Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can please you. Send samples for prices.



**THE**  
**BETHLEHEM**  
**IRON COMPANY,**  
 SOUTH BETHLEHEM, PENNA.  
**STEEL RAILS,**  
**BILLETS AND MUCK BAR,**  
**STEEL FORGINGS,**  
 HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.  
 Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.  
**NEW YORK OFFICE, - - - 80 BROADWAY.**  
**PHILADELPHIA OFFICE, - - 421 CHESTNUT ST.**

**THE S. OBERMAYER CO.,**  
 Cincinnati, O., and Chicago, Ills.  
 —MANUFACTURERS OF—  
**FOUNDRY FACINGS, SUPPLIES and EQUIPMENTS**  
 —IMPORTERS AND REFINERS OF—  
 East India Plumbago, Black Lead and Graphite.  
 Brass and Iron and Steel Foundries completely equipped.  
**General Catalogue sent on Application.**

**PASSAIC ROLLING MILL CO.,** Paterson, N. J.  
 —MANUFACTURE—  
**ROLLED STEEL or IRON BEAMS**  
 Channels, Angles, Tees, Bars, Riveted Work, Fergings, Eye Bars, &c., &c.,  
 Also OPEN HEARTH STEEL BILLETS and SLABS.  
**NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.**

**THE MONTGOMERY IRON & STEEL COMPANY,**  
 DANVILLE, PA.  
 **PIG IRON, T AND STREET RAILS,**   
*Light Rails, 12 to 40 lbs. per yard.*  
**RAIL JOINTS, SPIKES AND BAR IRON.**

—ESTABLISHED 1850.—  
**ARCADE MALLEABLE IRON CO.**  
**WARREN MCFARLAND & CO.**  
**Malleable Iron and Steel Castings,**  
**WORCESTER, MASS.**  
 Correspondence solicited. Prices given upon receipt of patterns or samples. **GEO. B. BUCKINGHAM.**

**To Blast Furnace Managers:**

**THE Hawdon Slag Machine,**

for handling blast-furnace slag, has been thoroughly tested in actual practice.

It saves labor in loading and unloading.

Slag is delivered to cars in small pieces, perfectly cooled.

It saves cost of special cars and expensive repairs.

Cost of pig is reduced and slag may be profitably used.

Write to us for further information in regard to advantages, cost of construction and terms of license, or call and see the machine in operation at our Blast Furnaces.

**Cambria Iron Company, - Johnstown, Pa.,**

—UNITED STATES AGENT—

**"CATASAUQUA"**  
**HIGH GRADE**  
**Bars.**

**CATASAUQUA MFG. CO.**  
**Charles K. Barns & Co., Agents,**  
**224 South Fourth St., PHILADELPHIA.**

**L. & R. WISTER & CO.,**  
**257 So. 4th St., Philadelphia.**

**Gunbar Foundry and Forge Irons.**

**Kemble Pig Iron.**

**Tuscarawas (Black Band).**

**Warner & Co's Wash Irons.**

**Dealers in all kinds of Scrap Iron and Steel.**

**HENRY LEVIS & CO.,**  
**Manufacturers' Agents**

For Iron and Steel Rails, Car Wheels, Boiler  
 and Sheet Iron and General

Railway Equipments.

Old Rails, Axles and Wheels bought and sold.

**234 S. 4th St., Philadelphia.**

**Manhattan Rolling Mill.**

**JOHN LEONARD,**

**446 to 452 West St., New York.**

—MANUFACTURER OF—

**HORSE SHOE AND BAR IRON**  
**BLACKSMITH SUPPLIES.**

**OGDEN & WALLACE,**  
**577, 579, 581 & 583 GREENWICH ST.,**  
**NEW YORK.**

**IRON AND STEEL**

Of every description kept in stock.

**BLACK DIAMOND STEEL.**

All sizes of Cast and Machinery Steel constantly  
 on hand.

**WILLIAM H. WALLACE & CO.,**  
**IRON AND STEEL,**  
**66 Broadway, New York.**

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

**THE MAHONING VALLEY IRON CO.**

—MANUFACTURERS OF—

**Bar, Band, Sheet, Plate and Tank Iron,**  
**Angle Iron, Nails, Boat Spikes and Rivets,**

**YOUNGSTOWN, OHIO.**

**EXHAUST TUMBLERS,**  
**Hexagon, Round or Wooden**  
**BEST AND CHEAPEST.**

**WM. A. SWEETSER.**  
**39 Montello St., Brockton, Mass.**

**BIRMINGHAM IRON FOUNDRY,**

BIRMINGHAM, CONN.

**CHILLED ROLLS AND ROLLING  
MILL MACHINERY,****McCoy Patent Mill Pinions,  
Shears, Rotary Squeezers.****WIRE DRAWING MACHINERY**Special Rolling Machines for Gun Bar-  
rels, Hoes, Pick and Axe Polls, Odd  
Shapes and Tapers.

ESTABLISHED

1836.

**POWDER**

—FOR—

**Blasting, Mining and Sporting.  
ORANGE BRAND.  
ELECTRIC BLASTING APPARATUS  
SAFETY FUSE, &c.**Send postal card for Illustrated Pamphlet,  
showing sizes grains Powder, and describing  
Blasting Apparatus. Mailed **FREE**.**LAFLIN & RAND POWDER CO.**

New York Office, 29 Murray St.

**DYNAMITE,****RED STAR BRAND,**

For Mining, Quarrying and Stump Blasting.

Safety Fuse, Caps, Platinum Fuse, Leading  
and Connecting Wire, with every other requi-  
site for Blasting Purposes. The especial atten-  
tion of the hardware trade is invited to our  
line of goods.**NEW YORK POWDER CO.,**

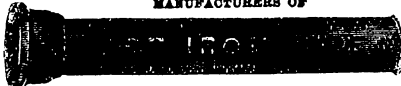
62 Liberty St., New York.

**Patent Tumbling Barrels.****MANY VARIETIES****For all Kinds of Work.**

Send for new Catalogue.

**HENDERSON BROS., WATERBURY, CONN.****S. CHENEY & SON,  
GRAY IRON CASTINGS,****CHEAP HEATING STOVES,****DIAMOND THIMBLES****MANLIUS, N. Y.****DONALDSON IRON COMPANY,**

MANUFACTURERS OF

**CAST IRON PIPE**And Special Castings for Water and Gas. Also Flange Pipe  
Emaus, Lehigh Co., Pa.**FINE GRAY IRON****FRANKLIN IRON FOUNDRY,****The Burr and Houston Company**83-89 Franklin Street, Brooklyn (Green-  
point), N. Y.**Special Attention Given to Fine Castings.**

Telephone Call, Greenpoint 174

**CHESS BROTHERS,**

MANUFACTURERS OF A FULL LINE OF

**SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.**

Always in stock. Special goods made to order.

**SOFT STEEL PLATES.**Suitable for Implement manufacture and for all Blanking or Stamping uses,  
of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive; in  
widths up to 15½ inches and to multiples of lengths desired. Finished black or  
scaled. And**EXPANDED METAL**In all its varieties of Fire-Proof Lath, Fencing, Tree Guards, &c. Send for catalogues  
and prices.Office, 531 Wood St., **PITTSBURGH, PA.**

J.S. SEAMAN.  
ROBT. SLEETH  
GEO. BLACK

**PHOENIX ROLL WORKS**  
**SEAMAN, SLEETH & BLACK**  
OFFICE & WORKS  
41ST & 42ND ST & AV. R.R.

**ROLLS AND PINIONS**  
EXCLUSIVELY.  
FOR ALL PURPOSES.

ESTABLISHED 1870

**ROLLS. ESTD. AND 1843 PINIONS.**

**THE TOTTEN & HOGG**  
**IRON & STEEL**  
**FOUNDRY CO.**  
OFFICE & WORKS  
24TH ST & AV. R.R.

**CHILLED & SAND ROLLS**  
**ROCK CRUSHERS.**

**SHEARS SQUEEZERS AND ROLLING MILL MACHINERY.**

GEORGE MESTA, Prest.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

**LEECHBURG FOUNDRY & MACHINE CO.,**

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes

**ROLLS.** MESTA'S PATENT PICKLING MACHINES AND TIN  
PLATE MACHINERY.

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.

**RAIL.  
BEAM.  
BAR.****ROLLS****STRUCTURAL.  
SPECIALS.  
SHAPES.****EAST CHICAGO FOUNDRY COMPANY,**

Office, 716 "The Rookery,"

CHICAGO.

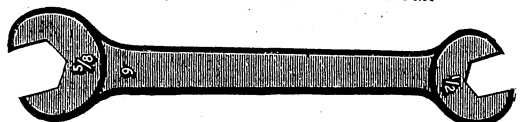
**DROP FORGINGS**

OF EVERY DESCRIPTION, IN IRON, STEEL, COPPER and ALUMINUM.

Hoist Hooks, Shafting Collars, Eye  
Bolts, Wrenches, Machine Han-  
dles, Fence Ornaments.  
SPECIAL ATTENTION GIVEN TO THE  
MANUFACTURE OF**SPECIAL FORGINGS.****PHILADELPHIA DROP FORCE COMPANY,**

Office and Works, S. E. Cor. American and York Sts., Philadelphia.

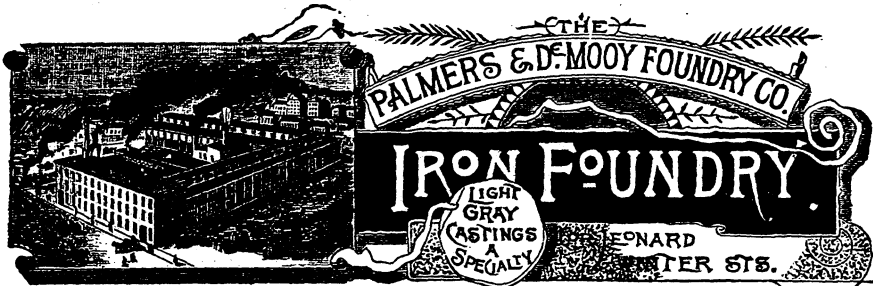
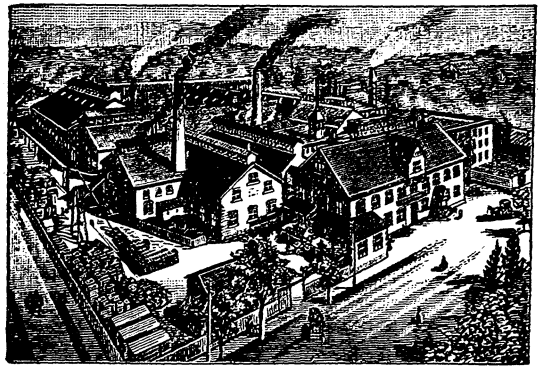
New York Agents: BATT, BONNELL &amp; THOMPSON, 34 Dey Street, N. Y.



# Sessions Foundry Co., BRISTOL, CONN. IRON CASTINGS TO ORDER.

We make small and large castings of all descriptions, of best quality, and at very low prices.

**CORRESPONDENCE SOLICITED.**



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing. **CLEVELAND, O.**

## STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,  
Of Open Hearth, Chester or Bessemer Steel.  
*True to Pattern. Sound. Solid.*  
Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.  
*Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.*  
Steel Castings of Every Description.  
**Chester Steel Castings Co.**  
Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

ROLLING MILL MACHINERY AND

# ROLLS.

THE ROBINSON-REA MFG. CO., Pittsburg, Pa.

## A Snap MOLDER

When he wishes to do good work always uses "Radiant Facing." If you haven't it in your shop you ought to try it. Sample free.

THE J. D. SMITH FOUNDRY SUPPLY CO., - CINCINNATI, O.

## DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.  
Sole Manufacturers of Ahlstrom's Patent Parallel Double  
**EXPANSION BOLTS,**  
also Single Expansion Bolts. Catalogues mailed on Application.  
**W. C. BOONE MFG. CO. - Office and Factory, - BOONTON, N. J.**

## Cranes AND Derricks.

**W. S. HALSEY & CO., - Birdsboro, Pa.**

**Pennsylvania Diamond Drill & Manufacturing Co.**  
BIRDSBORO, PA

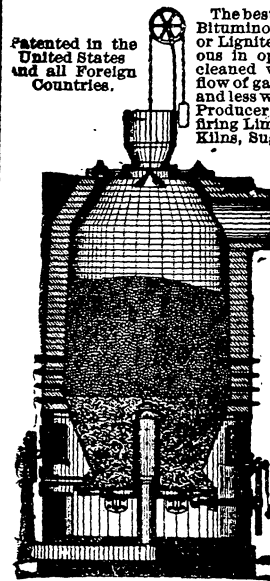
Drill Press and Planer Chucks. Steam and Gas Engines. Diamond Pointed Core Prospecting Drills. Boiler Fronts and General Castings. Mineral Lands Prospected and Artesian Wells Bored by Contract.  
**MACHINERY & ENGINEERING CO., Western Sales Agents, Chicago.**

**R. D. Wood & Co.** 400 Chestnut St.,  
PHILADELPHIA.

SOLE MAKERS OF THE

## TAYLOR REVOLVING-BOTTOM GAS PRODUCER.

The best Producer for either Bituminous or Anthracite coal or Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for firing Lime, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.



Also applicable to all Regenerative Furnaces. Send for Pamphlet.

## CAST IRON PIPE

MATHEWS' FIRE HYDRANTS  
EDDY VALVES.  
VALVE INDICATOR POSTS.  
Heavy Loam Castings  
Special Machinery.  
Water Power Pumps  
and  
TURBINES.

HYDRAULIC JIB and TRAVELING CRANES,  
FREIGHT and CAR LIFTS, Etc.  
GAS HOLDERS and GAS MACHINERY.

## The Iron-Masters' LABORATORY

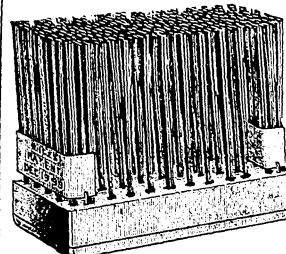
Exclusively for the  
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

Branch Office, 339 Walnut St., Philadelphia.

All Analytical Work at Warrenton, Virginia.  
**J. BLODGET BRITTON.**

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

## Rice's Pat. Casting Brush



will outwear three of any other kind. Our prices the lowest.

Send for Circular.

**THE RICE  
MFG. CO.,  
New Durham  
N.H.**

# Hardened Forged Steel Rolls.

**TRETHERWEY MFG. CO., - 47th ST., PITTSBURGH, PA.**

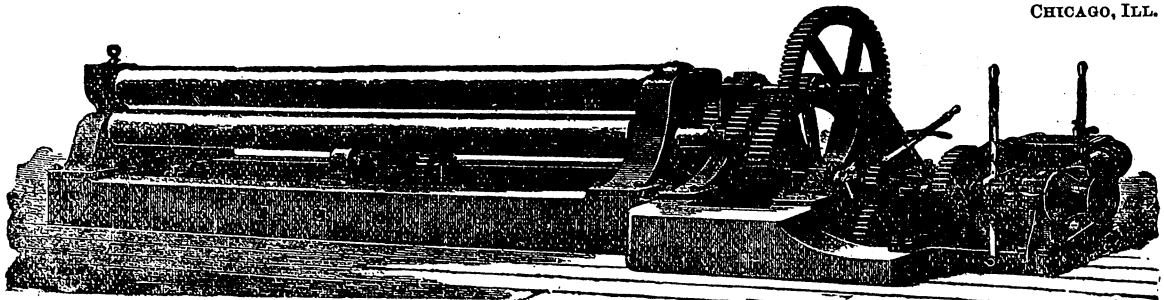
MANUFACTURERS OF

Roll Turning Tools, Solid Steel Shear Knives, Tool Steel Dies of any size, Forgings of Machinery or Tool Steel, Rolling Mill Machinery, Steam Hammers, Squaring Shears, Double Headed Rotary Shears, Shear Grinding Machinery, Circle Cutting Machines, Roll Lathes.

# Wickes Patent Plate Bending Rolls.

**WICKES BROS., SAGINAW (E. S.), MICH.**

And  
510 MONADNOCK BLDG.,  
CHICAGO, ILL.



The Plates for the Famous McDougall Whale-Back Ships are shaped on Rolls of our Manufacture.

## REFERENCES :

AMERICAN STEEL BARGE CO.,  
ERIE CITY IRON WORKS,  
J. C. McNEIL CO.,

West Superior, Wis.  
Erie, Pa.  
Akron, Ohio.

AMES IRON WORKS,

T. M. NAGEL

ROHAN BROS. BOILER MANUFACTURING CO.,

Oswego N. Y.  
Erie, Pa.  
St. Louis, Mo.

# ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

Gas Heating  
Gas Puddling  
Open Hearth  
Crucible  
Tube Welding

# FURNACES

AND ARTIFICIAL GAS PRODUCERS OF  
EVERY DESCRIPTION, for ROLLING MILLS,  
STEEL AND TUBE WORKS.

We guarantee to place all Plants erected by  
us in successful operation

M. V. SMITH, PRES.  
G. C. MORROW, SEC.

M. A. GREENE, VICE-PRES  
JOHN A. ELLIOTT, TREAS.

# Artificial Gas Engineering Co., Consulting and Contracting ENGINEERS.

ARTIFICIAL Gas applied to all Branches  
of Manufacturing and Domestic Uses.  
Apparatus for the Manufacture of  
Coal-Gas Furnished at Lowest Prices

706 TIMES BUILDING,  
PITTSBURGH, PA.

**HENRY AIKEN,**

Consulting Mechanical Engineer,

Rooms 203-206 Lewis Block,  
PITTSBURGH PA.

# THE S. R. SMYTHE COMPANY,

LEWIS BLOCK, ENGINEERS AND CONTRACTORS, PITTSBURGH, PA.

**Regenerative Gas Furnaces and Gas Producers  
For All Purposes.**

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc.

We contract for complete Plants, guarantee results and operation. OVER 100  
PLANTS BUILT AND WORKING.

McAULEY FEED WATER HEATER AND PURIFIER. Clean Boilers Guaranteed at  
small cost. No scale, better service, and saving in fuel.

# JULIAN KENNEDY,

Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills,  
STEAM AND HYDRAULIC MACHINERY, &c.

— Branch Office of The Latrobe Steel Works. —

# Wm. Swindell & Bros.,

ENGINEERS AND CONTRACTORS,

Regenerative and Recuperative Gas Furnaces for  
Steel, Iron and Glass.

**SWINDELL'S IMPROVED GAS PRODUCERS,**

243 BUILT SINCE APRIL 1, 1891.

P. O. Box 945.

548 Smithfield St., Pittsburgh, Pa

Haines Gauge Co.,

906 Filbert St.,

PHILADELPHIA,  
PA., U. S. A.



The HAINES Automatic Micrometer Rolling  
Mill GAUGE.

For reducing HOT WORK in process of rolling.

JAMES HEMPHILL, President.  
WM. H. CONLEY, Treasurer.

THOS. B. RITER, Vice-President.  
JNO. F. WILCOX, Gen'l Manager.

## PITTSBURG IRON & STEEL ENGINEERING CO.

LEWIS BLOCK, PITTSBURG, PA., U. S. A.

### BESSEMER AND OPEN-HEARTH STEEL PLANTS.

Rolling Mills (Blooming, Rail, Plate, &c). Blast Furnaces, Engines  
Boilers, Bridges, Girders, Iron Buildings.

WORKS BUILT COMPLETE and Fully Equipped for Operation.

## THE D. R. LEAN COMPANY, Blast Furnace and Steel Plant Construction,

Penn Building, Pittsburgh, Pa.

**J. A. HERRICK, M. E.,**  
Consulting Engineer and Contractor:  
Room 609, 284 Pearl Street, NEW YORK.

### — STEEL CASTING PLANTS A SPECIALTY. —

Melting and Heating Furnaces of ALL KINDS.  
Patent Gas WATER VALVES. Improved "BASIC" and "SEMI-STEEL" Processes and FURNACES.  
New CONTINUOUS Gas PRODUCERS.

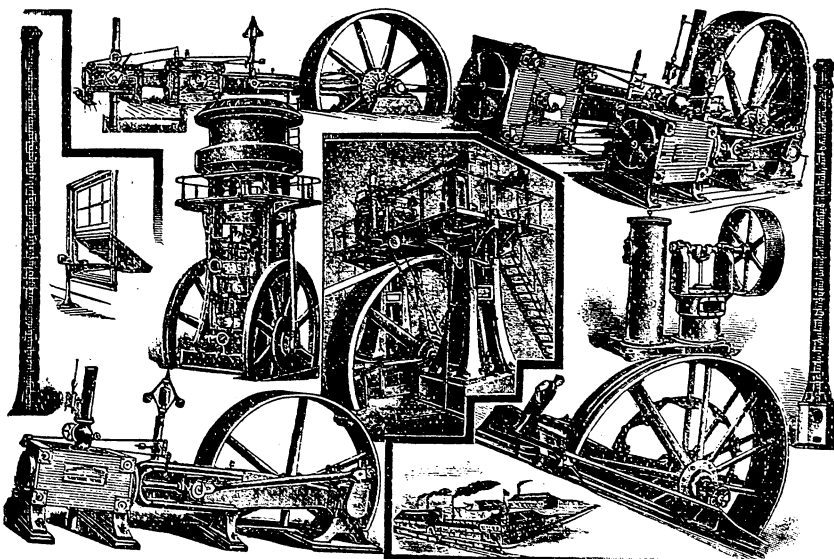
— PHILADELPHIA CORLISS ENGINES. —

AIR PUMPS AND CONDENSERS.

BAND AND FLY WHEELS.

STEEL-PLATE CHIMNEYS.

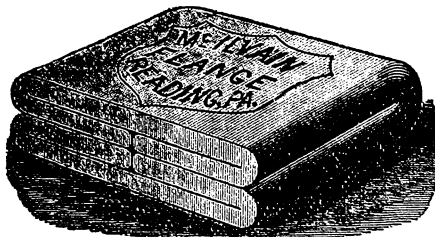
— BLOWING ENGINES. —



BUILT BY

**PHILADELPHIA ENGINEERING WORKS, LIMITED,**  
MIFFLIN STREET, EAST OF FRONT,  
PHILADELPHIA, PA.

TENSILE } 56,000 to 64,000 lbs.  
STRAIN. }



CAPACITY. { Plates 1 inch thick to No. 12.  
30 feet long.  
70 inches wide.

**WM. McILVAIN & SONS,**

READING, PA.,

MANUFACTURERS OF

IRON AND STEEL

## BOILER PLATES.

Locomotive, Fire Box, Flange, Shell,  
Tank Iron and Steel, including Plates for  
Bridges, Girders, Stacks, Pipe and Fire  
and Burglar-proof Safes.

## THE ALLENTOWN ROLLING MILLS,

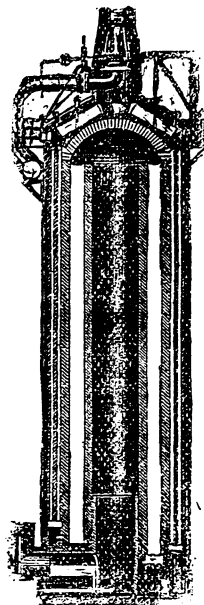
MANUFACTURERS OF

Fig Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Fish  
Plates, Bolts, Nuts and Spikes.

Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Ma-  
chinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders  
of all classes of Machinery. Makers of Castings of all descriptions for Cable and  
Electric Railway.

ALLENTOWN, PA.

## McCLURE & AMSLER, Engineers and Contractors



Bissell Block,  
PITTSBURGH, PA.

### Blast Furnace Construction

A SPECIALTY.

Sole Agents for

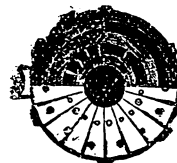
MASSICK'S & CROOKE'S

PATENT

### Fire Brick Stoves,

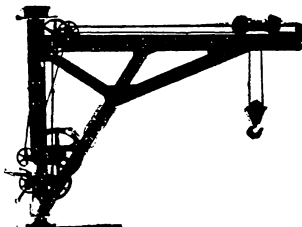
Designs and Estimates  
for the construction of  
Blast Furnace Work,  
and for all kinds of Hot

Blast Fire Brick or Pipe  
Stoves; and all other kinds  
of Brick Work pertaining  
to Steel Plants, Iron, Brick  
or Wooden Buildings, all  
kinds of Iron Construction  
in general.



We propose to put into successful  
operation all the plants we design and  
contract for.

## Detroit Foundry Equipment Co.



# Cranes

THE WHITING

## CUPOLA.

Unequaled for Econ-  
omy and Convenience.

LADLES, TRUCKS,  
TUMBLERS,

SAND SIFTERS, &c., &c.

CHICAGO: 225 Dearborn Street.  
DETROIT: Michigan Ave. & D & B.  
C. Ry.



**Pumps and Pumping Machinery.** Part 1. By  
FREDERICK COLYER, M. Institute C. E. Second edi-  
tion, revised and enlarged. Synopsis of contents:  
Lift Pumps.—Driving gear. Beer, tar, vinegar,  
sewage and well pumps, &c. Force pumps, va-  
rious kinds. General details of lift and force  
pumps. Arrangement of engine and pumps. Depth  
of suction, water towers, &c. Sundry pumps.—  
Centrifugal, drainage and dock pumps, chain  
pumps, air pumps, blowing engines and compress-  
ors. Engines for working pumps. Horizontal high-  
pressure engines. Compound engines. Vertical  
engines. Quadruple-expansion engines. Data of  
working results, &c., &c. Cornish engines. Beam  
and bull engines. Fuel consumed. Boilers, verti-  
cal, cylindrical, Cornish, Lancashire, multitubular,  
patent water tube boilers, &c. Engine houses, de-  
tails of construction, fittings for rooms, &c. Boiler  
houses. Index. 200 pages. 53 large folding plates  
to scale. Cloth, 8vo. ....\$10.00

For sale by David Williams, 96-102 Reade St. N. Y.

**CYRUS BORGNER.**  
SUCCESSION TO BURGNER & SONS  
23<sup>rd</sup> ST. ABOVE TRACE PHILADELPHIA, U.S.A.

**FIRE BRICK  
AND  
CLAY RETORTS**

ESTABLISHED 1856.

**HENRY MAURER & SON,**  
MANUFACTURERS OF  
**FIRE BRICK**  
of all Shapes and Sizes,  
420 E. 23d St., New York.

**B. KREISCHER & SONS,**  
**FIRE BRICK**

BEST AND CHEAPEST.

ESTABLISHED 1845.

Office, foot of Houston Street, East River, NEW YORK.

ESTABLISHED 1864.

**JAMES GARDNER & SON,**  
MANUFACTURERS OF

"STANDARD SAVAGE" FIRE BRICK  
TILE and FURNACE BLOCKS

OF ALL SHAPES AND SIZES.

WORKS, Ellerslie, Allegheny Co., Md.  
OFFICE, Cumberland, Md., P. O. Box 540.

S. M. Hamilton & Co., Agents, - Baltimore, Md.  
Stowe, Fuller & Co., Agents, - Cleveland, O.

Established 1848.

**Ostrander Fire Brick Company**

Manufacture Fire Brick for all purposes.

Works at TROY, N. Y., and OSTRANDER, N. J.  
Main Office, TROY, N. Y., to which correspondence  
should be addressed.

Export Agent, J. W. D. Melghan, 111 Water St.,  
New York City.

**A Trial will  
Convince You**

— THAT WE MAKE —  
**SOFT AND SMOOTH**  
**Light Gray Iron Castings,**

- - SOUND - -

**Brass and Bronze Castings**

**TRUE TO THE PATTERN.**  
Also HAVE FACILITIES FOR FINISHING.  
Sample for estimate solicited.  
I. S. SPENCER'S SONS, Guilford, Conn.

**HIGH GRADE****LIGHT GRAY IRON CASTINGS**

SOFT, SMOOTH and EASILY DRILLED.

Patented Articles a Specialty.

SUPERIOR QUALITY. PRICES LOW.

**Allentown Hardware Works,**  
ALLENTOWN, PA.

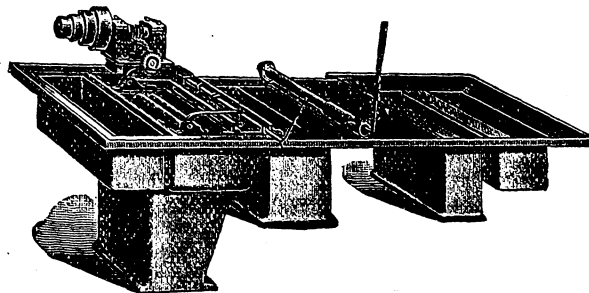
**VULCAN IRON WORKS**  
CHICAGO

**PILE DRIVERS**

**M. D. VALENTINE & BRO -**  
**FIRE BRICK**  
**WOODBIDGE, N. J.**

**THE LLOYD BOOTH CO.,****YOUNGSTOWN,  
OHIO.**

Tinning  
MACHINERY.



Rolling Mills,  
Sand and Chilli  
ROLLS.

**GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS**  
of the very best quality.

Very much time saved by using clean and soft castings. We use only the best material. A trial will convince you. PICKETS and ROSETTES for Wire Workers. Catalogue of same. NICKEL PLATING and JAPANNING, also METAL PATTERN MAKING and LIGHT MACHINE WORK. We invite correspondence.

**HAIGHT & CLARK, - - ALBANY, N. Y.****ESTIMATES**GIVEN ON ALL  
KINDS OF**HEAVY MACHINERY**AND  
CASTINGS.

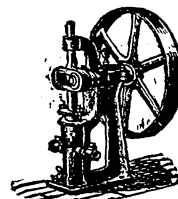
THE BEST EQUIPPED FOUNDRY AND MACHINE SHOP IN AMERICA FOR HEAVY WORK.

**THE WALKER MFG. CO.,**  
CLEVELAND, OHIO.

**POWER BOILER FEED PUMPS**

in 9 sizes, for from 2 to 100 H.-P. Boilers. The large sizes are geared, all self-contained, very strong built with large bearings and are both durable and reliable. They handle hot water from heater. Special heavy brass valves. Send for catalogue and prices.

**C. O. LUCAS & CO.** 38 E. Front St. Greenville, Ohio.



Strong, Well Built, Serviceable  
ADAPTED TO  
HEAVY  
CONTINUOUS  
WORK

**STEAM ENGINES** SINGLE OR DOUBLE.  
**BOILERS** TUBULAR AND FIRE-BOX.

**CIRCULAR SAW MILLS**

AND MULAY

IN STOCK FOR IMMEDIATE DELIVERY.

FOR DESCRIPTIVE CATALOGUES ADDRESS

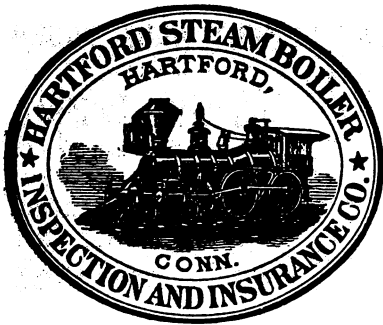
**CHANDLER & TAYLOR CO., INDIANAPOLIS, IND.****COLD DRAWN STEEL****SEAMLESS TUBING**

**SHELBY STEEL TUBE CO.**



The first in America. The largest and best in the world. Now prepared to make all shapes and sizes, including round square, octagon, corrugated, and half circle with double re-entering angles. Address, for samples and prices,  
**SHELBY, OHIO.**





# THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

## Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas.

### BOARD OF DIRECTORS:

J. M. ALLEN, President.  
 FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.  
 CHARLES M. BEACH, of Beach & Co.  
 DANIEL PHILLIPS, of Adams Express Company.  
 RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.  
 THOMAS O. ENDERS, of the United States Bank.  
 LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.  
 GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.  
 NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.  
 HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.  
 A. W. JILLSON, late Vice-Prest. Phoenix Fire Insurance Co., Hartford, Conn.  
 EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.  
 GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.  
 HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.  
 C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.  
 PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

## THE EYNON-EVANS MANUFACTURING CO.,

Patentees and  
Manufacturers of

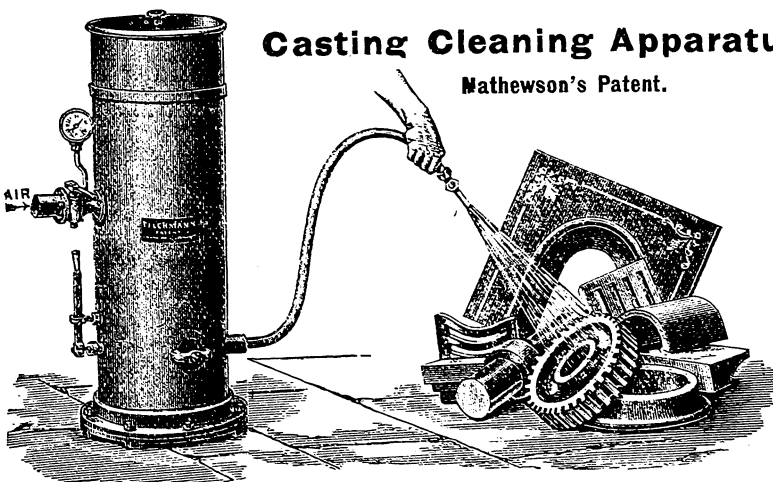
## THE EYNON-KORTING COMPOUND INJECTORS.

Extra Heavy Globe and Angle Valves.  Brass Castings up to 5000 lbs.

Blowers, Ventilators, Blast Nozzles, Exhausters, Brass Syphons, Acid Syphons, Condensers.

Fifteenth and Clearfield Sts., Philadelphia, Pa.

## TILCHMAN'S PAT. SAND BLAST COMPANY, LTD.



Casting Cleaning Apparatus

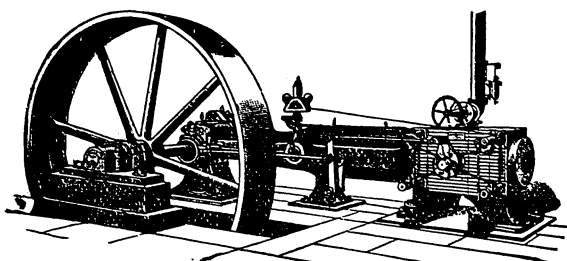
Mathewson's Patent.

SHEFFIELD, ENG.,

MANUFACTURERS OF

Patent Sand Blast Apparatus for sharpening and scouring files, cleaning steel, iron and brass castings, forgings, stampings, plates, &c.; also for obscuring, decorating and perforating all descriptions of glass, and cutting inscriptions and other designs on granite, marble and other stones.

## THE LANE & BODLEY CO.,



### Cincinnati, O. ENGINES,

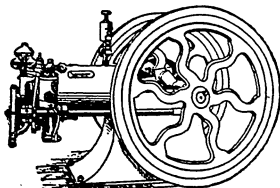
ALL SIZES

Simple and Compound,  
CORLISS ENGINES A SPECIALTY.

Heavy Slide Valve Engines.  
Shafting, Hangers, Pulleys,  
Belt Elevator, etc.

## The "Lambert" Gas and Gasoline Engines.

POWER from natural gas, coal gas and gasoline direct from tank. 1 to 50 H.-P. stationary; 6 to 20 H.-P. portable. Reliable power for less than 1 cent per hour per H.-P. No boiler, no fire, no steam, no



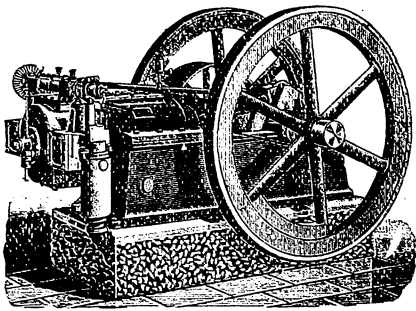
engineer, no dirt and perfectly safe. Suitable for running all kinds of manufacturing plants, electric light plants and for all purposes where reliable power is required. Write for description and prices.

THE BUCKEYE MFG. CO., 50, 51, 52 and 53 Division St.,

UNION CITY, IND.



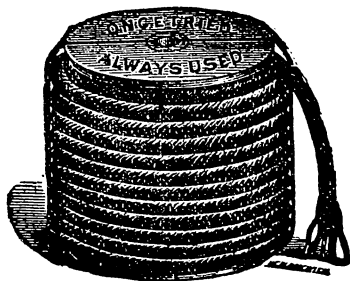
SEND FOR CATALOGUE "A."



## Gas and Gasoline ENGINES,

Using Natural Gas, Coal Gas, Producer, Gas and Gasoline direct from the tank. 1 to 40 H. P., actual.

THE SPRINGFIELD GAS ENGINE CO.,  
20 W. Washington St., Springfield, O.



Send for a Sample of  
**Morrison's Patent Self-Lubricating Packing**  
**ROBT. MORRISON,**  
5034 Arsenal St., St. Louis, Mo.



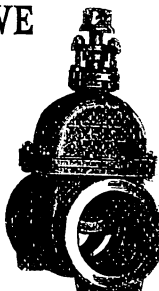
## CHAPMAN VALVE MFG. CO.

Manufacturers of  
**VALVES & GATES**

For Water, Steam, Gas,  
Ammonia, &c.

**GATE FIRE HYDRANTS,**

With and without independent outlets.



We make a specialty of Valves with Bronze seats for High Pressure steam.  
Works and General Office,

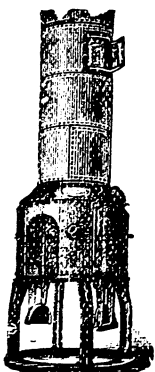
**INDIAN ORCHARD, MASS.**

Treasurer's Office,

72 Kilby and 112 Milk Streets,

**Boston, Mass.**

Chicago Office, 24 West Lake St. New York Office  
28 Platt Street.

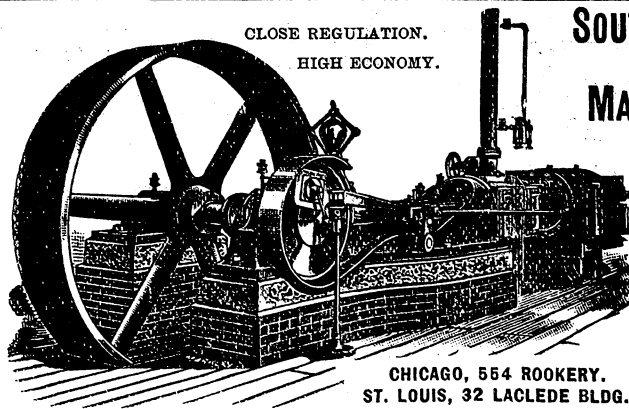


THE COLLIAU PATENT  
**Cupola Furnace**

LEADS ALL OTHERS IN

**ECONOMY,  
CAPACITY  
DURABILITY.**

Correspondence Solicited.  
**BYRAM & COMPANY,**  
Exclusive Manufacturers,  
DETROIT, MICH.



CLOSE REGULATION.  
HIGH ECONOMY.

## SOUTHWARK FOUNDRY — AND — MACHINE COMPANY,

Philadelphia, Pa.

Sole Makers of

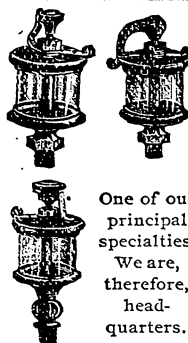
**THE PORTER-ALLEN  
AUTOMATIC ENGINE,**

SIMPLE, COMPOUND  
OR TRIPLE EXPANSION.

Also Builders of  
**BLOWING ENGINES,  
REVERSING ENGINES,  
CENTRIFUGAL PUMPS,  
BOILERS, TANKS, ETC.**

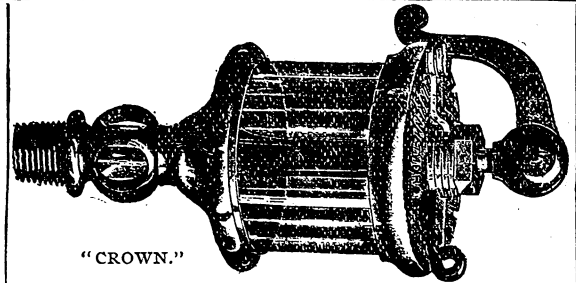
CHICAGO, 554 ROOKERY.  
ST. LOUIS, 32 LACLEDE BLDG.

## GLASS OIL CUPS



One of our  
principal  
specialties.  
We are,  
therefore,  
head-  
quarters.

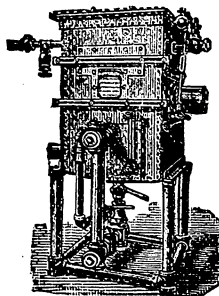
Get our catalogue  
of superior Steam  
Specialties.



"CROWN."

**IF YOU WANT practical, durable, economical,  
efficient Cups, you want "LUNKENHEIMER'S."**  
Specify our make and get the best. For sale by  
Dealers everywhere.

**THE LUNKENHEIMER COMPANY,**  
CINCINNATI, O., U. S. A.



## WE GUARANTEE YOU

a very considerable saving in the items of water and fuel by the use of our **Vacuum Feed Water Heater and Purifier**, and this means, of course, an extra profit on your output. The "how" will be found in a comprehensive Catalogue, which is yours for the asking, also Catalogues of the Webster Separator and Williams Vacuum System of Steam Heating.

**WARREN WEBSTER & Co.,**

NEW YORK, 126 Liberty Street.  
CHICAGO, Monndnock Building.

No. 2.

**CAMDEN, N. J.**

## STEAM

— IS RELIEVED OF —

## OIL AND WATER

By passing through Webster Separators.

SEND FOR COPY OF TESTS AND CATALOGUE TO

**WARREN WEBSTER & CO.,**

**Camden, N. J.**

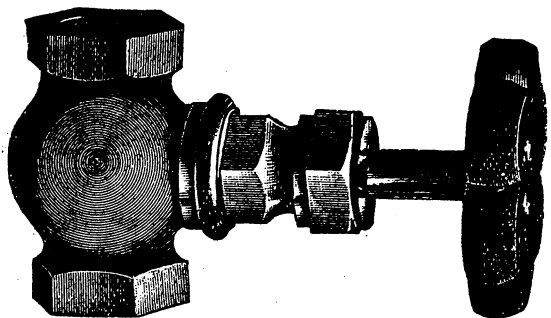


**MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N.Y.**

**BLAST FURNACES,  
ROLLING MILLS,  
STEEL WORKS,  
MINES, ETC.,  
ETC.**



**OIL WELLS,  
REFINERIES,  
ELECTRIC LIGHT PLANTS,  
WATER WORKS, ETC.,  
ETC.**



**McNAB & HARLIN MFG. CO.,**  
—MANUFACTURERS OF—  
**BRASS COCKS AND VALVES**  
For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless  
Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



**THE CONTINENTAL IRON WORKS**

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS OF—

**CORRUGATED FURNACES, FOR MARINE AND  
LAND BOILERS.**

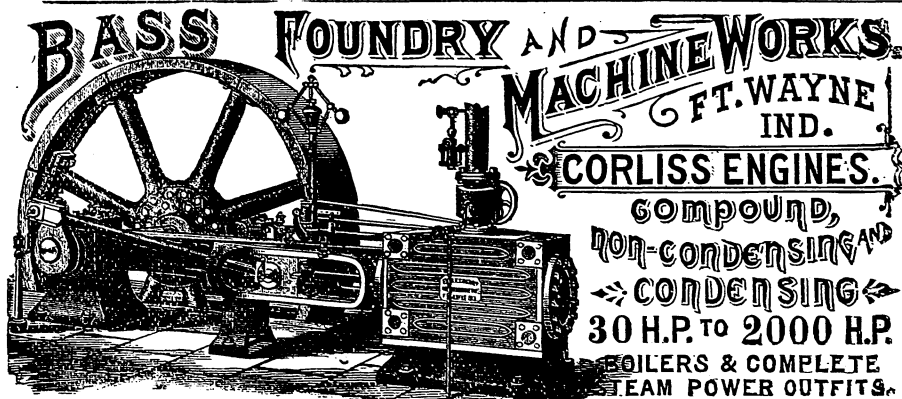
Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Thos. F. Rowland, Pres.  
Thos. F. Rowland, Jr., Treas.

Warren E. Hill,  
Chas. H. Corbett,

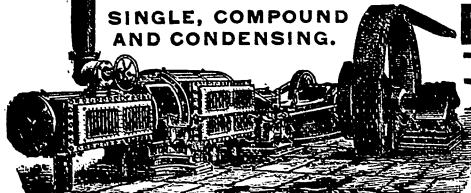
Vice-Pres.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.



**WILLIAM TOD & CO.,**  
YOUNGSTOWN, OHIO.

SINGLE, COMPOUND  
AND CONDENSING.



**PORTER-HAMILTON  
ENGINE**

Blowing Engines,  
Hydraulic Cranes & Accumulators  
Heavy Special Machinery.  
ENGINE CATALOGUE ON APPLICATION.

The Improved  
**WHARTON - HARRISON  
SAFETY BOILER,**

For all Power and Heating Purposes.  
Single Boilers 2-240 H.-P.  
Batteries of any Capacity.

THE COCHRANE  
FEEDWATER HEATER.

THE COCHRANE  
FEEDWATER HEATER & PURIFIER.

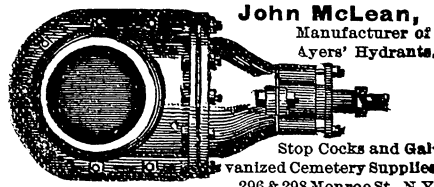
THE COCHRANE

**SEPARATOR.**

Horizontal or Vertical Form. For Obtaining  
Dry Steam. Purified Exhaust.

FOR PARTICULARS ADDRESS

Harrison Safety Boiler Wks.,  
Germantown Junction. PHILADELPHIA, PA.



Stop Cocks and Gal-  
vanized Cemetery Supplies  
290 & 298 Monroe St., N. Y.

**Totten & Hogg I. & S. F'dry Co.,**

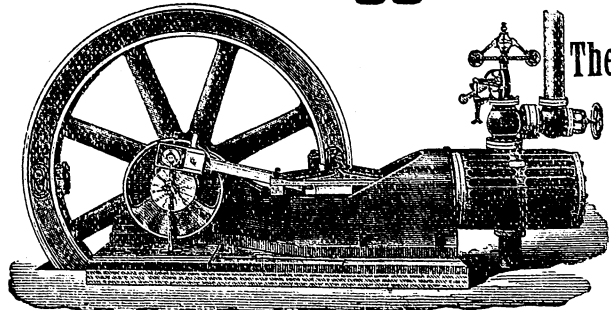
Manufacturers of

The "Aetna" Rolling Mill

**ENGINE**

Chilled and Sand  
Rolls and Rolling Mill  
Machinery,

PITTSBURGH, PA.



**BOSTON GEAR WORKS**

37 Hartford St., Boston, Mass.

HEADQUARTERS FOR GEARS.

Book on Gears, 170 Illustrations, \$1.00. Job Gear  
Cutting of all kinds. Spur, Bevel, Spiral, Ratchet,  
Worm, Rack, Elliptic, Index Plates, &c. Very small  
or large. Send for 1892 Catalogue; 1200 sizes of Gears.

Hosted by Google

# THE C. & C. ELECTRIC COMPANY,

—MANUFACTURERS OF—

## MULTIPOLAR DYNAMOS, DIRECT DRIVEN OR BELTED,

IN SIZES UP TO 250 H.P.

Bipolar Dynamos up to 100 H.P. Electric Motors, Automatic or Hand Controlled. Complete Plants for Power Transmission. Isolated Lighting Plants. Central Station Apparatus.

General Office, 143 Liberty St., New York. Works, Garwood, N. J., on Central R. R. of N. J.

BRANCH OFFICES: CHICAGO, Monadnock Building. BOSTON, 63 Oliver Street. CLEVELAND, Cuyahoga Building. PHILADELPHIA, 633 Arch Street.

# NICKEL

# PLATING

SEND FOR CATALOGUE OF  
NICKEL & ELECTRO-PLATING  
SUPPLIES & POLISHING MATERIALS.

ZUCKER & LEVETT  
CHEMICAL CO.

8 TO 14 GRAND STREET,  
NEW YORK, U. S. A.

# OUTFITS.



Langbein's New and Splendid Book on the  
Electro-Deposition of Metals.

A COMPLETE TREATISE  
ON

## Electro-Deposition of Metals.

Comprising Electro-Plating and Galvanoplastic Operations, the Deposition of Metals by the Contact and Immersion Processes, the Coloring of Metals, the Methods of Grinding and Polishing, as well as descriptions of the Electric Elements, Dynamo-Electric Machines, Thermopiles, and of the Materials and Processes used in every department of the Art. Translated from the German of Dr. George Langbein, with additions by William F. Brann, editor of the "Techno-Chemical Receipt Book." Illustrated by 125 Engravings. In one volume, 8vo, 404 pages. Price...\$4.00

### Abstract of Contents.

I. GENERAL HISTORICAL PART. CHAPTER I. HISTORICAL REVIEW OF ELECTRO-METALLURGY.  
II. THEORETICAL PART. CHAPTER II. MAGNETISM AND ELECTRICITY. I. Magnetism. II. Electricity; Electro-Magnetism; Induction; Chemical Actions of the Electrical Current—Electrolysis.  
III. SOURCES OF CURRENT. CHAPTER III. GALVANIC ELEMENTS; THERMO-PILES; MAGNETO AND DYNAMO-ELECTRIC MACHINES.  
IV. PRACTICAL PART. CHAPTER IV. ARRANGEMENT OF ELECTRO-PLATING ESTABLISHMENTS IN GENERAL; ELECTRO-PLATING ARRANGEMENTS IN PARTICULAR. V. TREATMENT OF THE METALLIC ARTICLES. (a) Mechanical Treatment; (b) Chemical Treatment. VI. PROCESSES OF ELECTRO-DEPOSITION; REDUCTION OF METALS WITHOUT A BATTERY (Electro-Deposition by Contact). VII. DEPOSITION OF NICKEL AND COBALT. 1. Nickelling; 2. Cobalting. VIII. DEPOSITION OF COPPER, BRASS AND BRONZE. 1. Coppering; 2. Brassing (Cuiropoli Deposit); 3. Bronzing. IX. DEPOSITION OF SILVER. X. DEPOSITION OF GOLD. XI. DEPOSITION OF PLATINUM AND PALLADIUM. 1. Deposition of Platinum. 2. Deposition of Palladium. XII. DEPOSITION OF TIN, ZINC, LEAD AND IRON. 1. Deposition of Tin; 2. Deposition of Zinc; 3. Deposition of Lead; 4. Deposition of Iron (Steeling). XIII. DEPOSITION OF ANTIMONY, ARSENIC AND ALUMINUM. 1. Deposition of Antimony. 2. Deposition of Arsenic; 3. Deposition of Aluminum; XIV. GALVANOPLASTY (Reproduction). 1. Galvanoplastic Deposition in the Cell Apparatus; 2. Galvanoplastic Deposition by the Battery and Dynamo Machines. XV. COLORING. XVI. OXIDIZING, ETC. OF METALS, LACQUERING. XVII. APPARATUS AND INSTRUMENTS. XVIII. HYGIENIC RULES FOR THE WORKSHOP. XIX. CHEMICAL PRODUCTS USED IN THE ELECTRO-PLATING ART. XIX. USEFUL TABLES. INDEX.

Sent, post-paid, on receipt of price by

DAVID WILLIAMS

Publisher and Bookseller,

96-102 Reade St., New York.

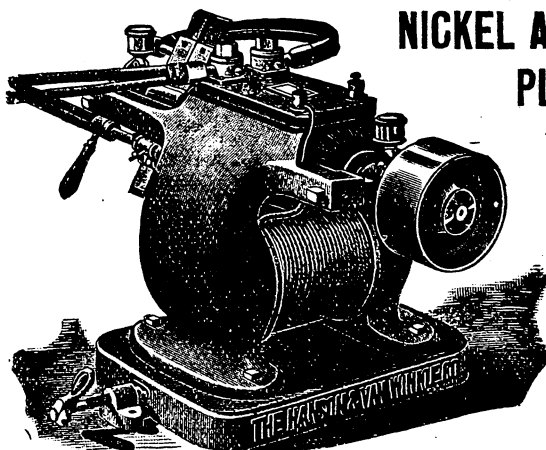
ESTABLISHED 1820.

INCORPORATED 1891.

## The Hanson & Van Winkle Co.,

MANUFACTURERS OF

## NICKEL AND ELECTRO PLATERS' MATERIAL.



WE FURNISH EVERYTHING.

Nickel-Plating Outfits

From \$20 upward.

DYNAMO-ELECTRO MACHINES  
For all purposes.

The New H. & V. W. Dynamo Machine.

In sizes from No. 1 to No. 5.

FROM \$100 TO \$800.

These machines will be placed on 30 days' trial with responsible parties, and if not satisfactory may be returned at our expense. Guaranteed 30% more powerful than any machine in the market at same price.

219-221 Market St., Newark, N. J.

81 Liberty St., New York.

35-37 South Canal St., Chicago, Ill.

## DYNAMOS

—FOR—

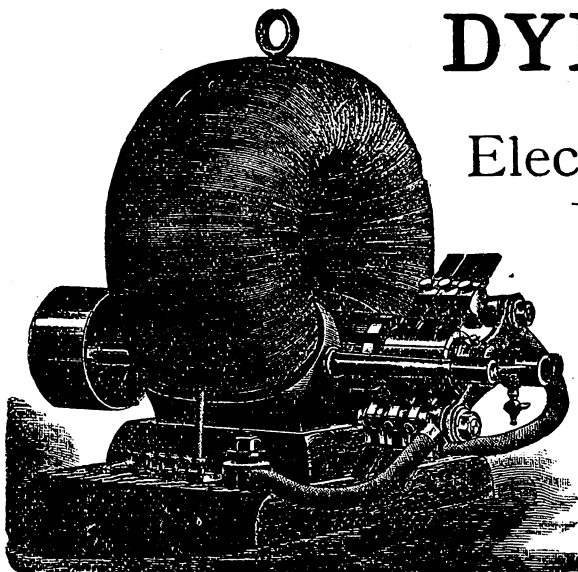
## Electro-Plating.

SIMPLE,  
DURABLE and  
EFFICIENT.

The Best Machine Made.  
Satisfaction Guaranteed.

—THE—

Eddy Electric Mfg. Co.  
Windsor, Conn.



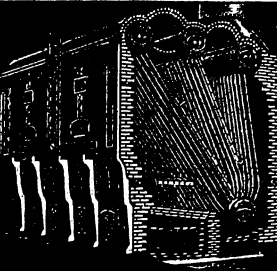
# STEAM

## BOILERS.

We make a better stationary tubular boiler, make it of flange steel, with weldless braces and eclipse manholes, and sell them for one-third less than the old style. Send for lithographs and detail illustrations.

Fulton Steam Boiler Wks. & F'dy,  
RICHMOND, IND

SAFE. EFFICIENT.  
ECONOMICAL.  
DURABLE.  
PRACTICALLY  
SELF-CLEANING.  
NO CAST METAL.



NO FLAT SURFACES.  
NO STAY BOLTS.  
REMOVAL OF FOUR  
MANHOLE PLATES  
GIVES ACCESS TO  
EVERY PART.

# THE STIRLING WATER TUBE SAFETY BOILER.

74 Cortlandt St., New York.  
418 Walnut St., Phila.  
Cuyahoga Building, Cleveland.

**THE STIRLING CO.,**  
Gen'l Offices, Pullman Building,  
CHICAGO, ILL.

## POWER FROM GASOLINE.

DIRECT FROM THE TANK.

CHEAPER THAN STEAM No Boiler. No Steam. No Engineer.

FOR USE EVERYWHERE.

OTTO GASOLINE ENGINES, Stationary or Portable.

1 to 50 H. P. 8 to 20 H. P.

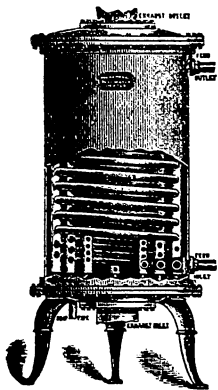
Running Expenses, Less than one cent per horse power per hour. For large engines, one-half cent per horse power per hour. Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply. The Best Auxillary Power for Night Work.

**OTTO GAS ENGINE WORKS,**

33d and Walnut Sts., PHILADELPHIA, PA.

CHICAGO OFFICE: 245 Lake St.

BOSTON OFFICE: 19 Pearl St.

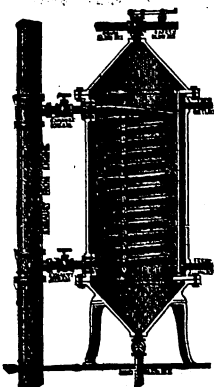


## The National Feed Water Heater

is a BRASS COIL HEATER, delivering water to the boilers at 212° Fahrenheit. It is low in price, but unequalled in efficiency. 500,000 H. P. in daily use attests its merits.

Coils and Bends of Iron, Brass, and Copper Pipe.

**THE NATIONAL PIPE BENDING CO.,**  
96 River St., New Haven, Conn.



## THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - Boston, Mass.

What you get when you buy the AMERICAN HEATERS:

COPPER COILS,  
SOLIDLY BRAZED,  
GUN METAL FITTINGS  
AND CLAMP STAYS,  
STEEL SHELLS,

NO RUSTING OUT,  
NO LEAKY JOINTS,  
NO TROUBLE FROM EXPANSION,  
NO BACK PRESSURE,  
NO OIL IN BOILER.

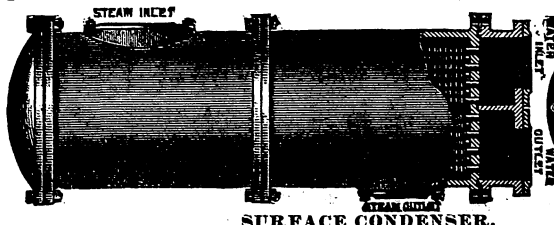
We guarantee this Heater to be the Most Durable, Effective and Cheapest

**WHITLOCK COIL PIPE CO.,**

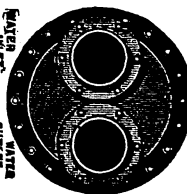
27 South Street, - - - - Elmwood, Conn.



## IT MAKES A BIG DIFFERENCE HOW



SURFACE CONDENSER.



the heating surface is distributed. The best feed water heater is the one which gets the most heat out of the waste steam, and that's what the Wainwright does. The Taunton (Mass) Locomotive Mfg. Co. would like to make this clear to you. To begin with, let us send you a catalogue.

# BOOKS

—ON—

## Mechanical and Steam Engineering.

### Complete Practical Machinist.

By JOSHUA ROSE. Embracing lathe work, vise work, drills and drilling, taps and dies, hardening and tempering, the making and use of tools, &c. Fifteenth edition; 356 illustrations; 430 pages.....\$2.50

### The American Steam Engineer.

Theoretical and practical, with examples of the latest and most approved American practice in the design and construction of steam engines and boilers of every description. For the use of engineers, machinists, boiler makers and students. By EMORY EDWARDS, M.E. Illustrated by 77 engravings; 419 pages; cloth.....\$2.50

### The New Catechism of the Locomotive.

Rewritten and enlarged with new matter and illustrations selected from the latest practice in this country. By M. N. FORNEY; 709 pages; cloth.....\$3.50

### Engineers' Sketch Book.

By THOMAS WALTER BARBER, engineer. Nearly 2000 illustrations, descriptive notes and memoranda; 243 pages; cloth.....\$3

### Locomotive Engine Running and Management.

A practical treatise on the locomotive engines, showing their performance in running different kinds of trains with economy and dispatch; also directions regarding the care, management and repairs of locomotives and all their connections. Illustrated by numerous engravings. Seventeenth edition. By ANGUS SINCLAIR, M.E. Cloth.....\$2

### Stationary Steam Engines.

Especially adapted to electric lighting purposes. Treating of the development of steam engines—the principles of construction and economy, with description of moderate speed and high speed engines. By Prof. R. H. THURSTON. Fourth edition; 177 pages cloth.....\$1.50

### Thermo-Dynamics, Heat Motors, and Refrigerating Machines

By PROF. DE VOLSON WOOD. Third edition, revised and enlarged; 452 pages; cloth....\$4

### Mechanics' and Engineers' Pocket Book.

By CHAS. H. HASWELL. Fifty-fifth edition; 556 pages; leather.....\$4

### Manager's Hand-Book of Modern Rules,

Tables and Data for Civil and Mechanical Engineers, Millwrights and Boiler Makers, Tool Makers, Machinists and Metal Worker's Iron and Brass Founders, &c. By W. S. HUTTON. Thick 8vo, half-bound.....\$6

### Valve Gears.

Analysis by Zeuner Diagram. By H. W. SPANGLER, P. A. Engr. U. S. Navy; 160 illustrations; cloth.....\$2.50

Sent, post-paid, on receipt of price by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 READE ST., - NEW YORK.

Awarded the Grand Prize at Late Paris Exposition.

SEND FOR THIS BOOK FREE ON APPLICATION.

**THE BABCOCK & WILCOX CO.** WATER TUBE STEAMBOILERS

30 CORTLANDT ST. N.Y.

BRANCH OFFICES:

- BOSTON, MASS. 8 OLIVER ST.
- PHILADELPHIA, PA. 32 N. 5TH ST.
- PITTSBURGH, PA. 408 LEWIS BLOCK
- CLEVELAND, O. 412 PERRY-PAYNE BLDG.
- CHICAGO, ILL. 45 S. JEFFERSON ST.
- MINNEAPOLIS, MINN. 604 CORN EX.
- NEW ORLEANS, LA. 57 CARondelet ST.
- HAVANA, CUBA. 116 1/2 CALLE DE LA UNION.

MANUFACTORIES IN UNITED STATES, SCOTLAND, FRANCE, GERMANY & AUSTRIA.

**R. POOLE & SON CO.**  
ENGINEERS, FOUNDERS and MACHINISTS.  
BALTIMORE, MD.

MANUFACTURERS AND DESIGNERS OF ALL KINDS OF  
**HEAVY MACHINERY,**  
REQUIRING FIRST CLASS WORKMANSHIP AND MATERIALS.

BAND, ROPE and FLY WHEELS, FRICTION CLUTCHES, SHAFTING, PULLEYS, and HANGERS.

**MACHINE MOLDED AND PLANED GEARING.**

MACHINERY for WHITE LEAD and FERTILIZER WORKS, GRAIN ELEVATORS and FLOUR MILLS, BRASS, COPPER and TIN PLATE ROLLING MILLS, CABLE and MARINE RAILWAYS.

POOLE-LEFFEL TURBINE WATER WHEELS.  
DREDGING MACHINES.  
IRON CASTINGS OF 30,000 LBS. TENSILE STRENGTH.

JUST ISSUED.

## USES OF COMPRESSED AIR,

By ADDISON C. RAND.

134 PAGES, 94 ILLUSTRATIONS, PRINCIPALLY FROM ORIGINAL PHOTOGRAPHS AND DRAWINGS.

This handy volume is the only comprehensive work upon the uses of compressed air; it is accurate, readably written and beautifully printed upon heavy plate paper. Price \$1.00, postage paid. Order of the publishers,

THE REPUBLIC PRESS, 14 Lafayette Place, N. Y.,  
OR THROUGH ANY BOOKSELLER.

**THE GOUBERT**  
**FEED-WATER HEATER**

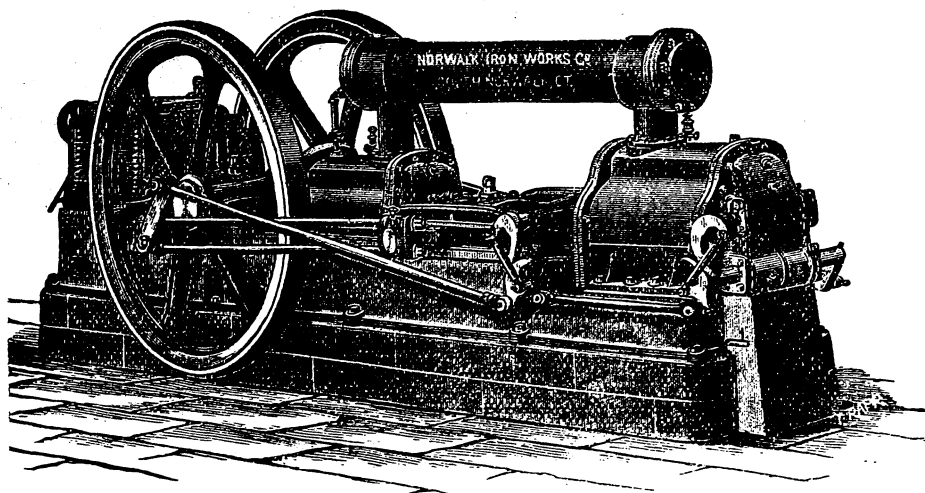
WRITE FOR CATALOGUE AND PRICES

IS THE BEST

14 & 16 CHURCH ST.  
COR. CORTLANDT.  
NEW YORK.



# Air Compressors.



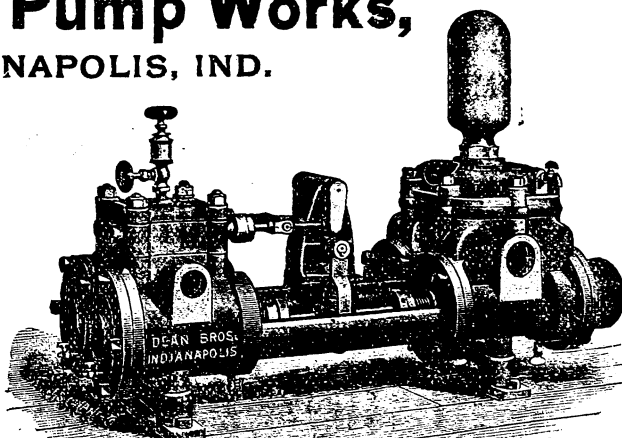
**THE NORWALK IRON WORKS CO., South Norwalk, Conn.**

**DEAN BROTHERS'**  
**Steam Pump Works,**  
 INDIANAPOLIS, IND.

DUPLIX PUMPS.

SINGLE PUMPS.

DEEP WELL  
 PUMPS.



Send for Catalogue  
 and Prices.



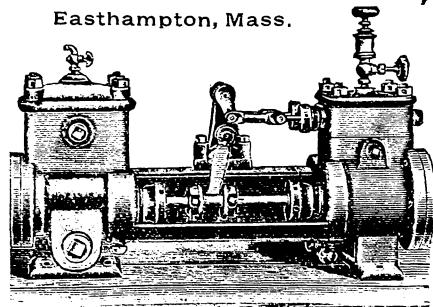
**CHEAPEST.  
 HANDIEST.  
 SIMPLEST. PUMPS.**

Handling Dirty, Gritty and Sandy Liquids, without Wear, Oil or Care. Pumping outfits for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging.

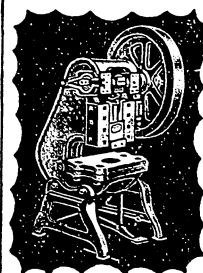
**MASLINS, 165-167 First St., Jersey City, N. J.**

**VALLEY PUMPS**  
 Single and Duplex.

**VALLEY PUMP CO.,**  
 Easthampton, Mass.



**STARK MACHINE & TOOL CO.,**  
 BUFFALO, N. Y.



GENTLEMEN: The dies you made for us are Better than the Average and there are some points about them which are far superior to any dies we ever used.

**ALDRICH & RAY MFG. Co.,**  
 Buffalo, N. Y.

**PRESS and SPECIAL DIES and TOOLS**

MANUFACTURED BY

**STARK MACHINE & TOOL CO.,**  
 BUFFALO, N. Y.

Triple and Quadruple Expansion Engines and Boilers and their Management. By A. RITCHIE LEASK. 59 illustrations, 12mo, cloth, \$2.00

For sale by David Williams, 96-102 Reade St., N. Y.

**The JOHN H. MCGOWAN CO.**

ROYAL STEAM PUMP, RIVAL STEAM PUMP, TWIN LEVER DUPLEX, 1893 SLIDE BOILER FEEDER, TRIPLEX, DEEP WELL PUMP.

**PUMPS FOR EVERY SERVICE** **CINCINNATI, OHIO.** **PRICE LIST ON APPLICATION**

Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

FACTORY OFFICE 46 CENTRAL AVE.

BRANCH HOUSE: 1425 E. Main St., Richmond, Va.

**Worthington Steam Pumps**  
**CONDENSERS and WATER METERS.**  
**HENRY R. WORTHINGTON,**  
 NEW YORK, 86 & 88 LIBERTY STREET.

Boston, 70 Kilby St.

Philadelphia, 607 Arch St.

Cleveland, 24 South Water St.

Chicago, 185 to 189 Van Buren St.

St. Louis, Eighth and St. Charles Sts.

**The WATERBURY-FARREL FOUNDRY & MACHINE CO., Waterbury, Connecticut,**

Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from Sheet Brass, Copper, Steel, Silver, &c., **POWER PRESSES, HYDRAULIC PRESSES,** Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

# The Brown Hoisting & Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.

## Complete Systems for Handling of Materials.

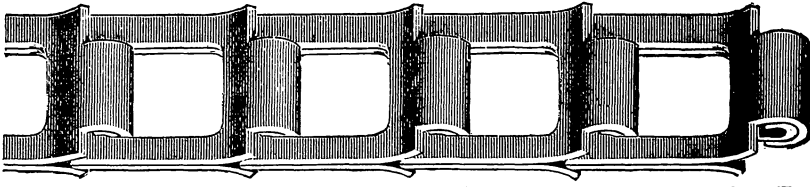
**THE BROWN PATENT** Bridge Tramway. Shed Tramway. Sewer Machinery Tramway.  
Cable Tramway. Warehouse Tramway. Automatic Furnace Hoist.

Traveling Crane for Shipbuilders, a perfect appliance for handling Frames, Armor Plates, etc. The Brown Patent Cantilever Derricks, in use on the Chicago Main Drainage Canal. Working Capacity of Cantilever 500 to 700 yards "solid rock in place" per day of 10 hours. **The Brown Patent Friction Clutch Hoisting Engine.**

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

## ROBERTS MANUFACTURING CO.,

2100 Smallman Street, PITTSBURGH, PA.

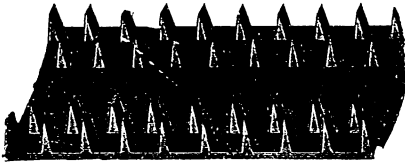


— MANUFACTURERS OF —

Patent Detachable Steel Link Belting, Sprocket Wheels and Shafting, also Malleable Wrought Steel Cable and Special Chains, Elevating, Conveying and Mining Machinery, Wire Rope Haulages and Tramways.

SEND FOR CATALOGUE.

### Talcott's Original Wilson Belt Hooks.



W. O. TALCOTT, Providence, R. I.  
MANUFACTURER OF

Four Styles of BELT HOOKS, including 184 Sizes.  
SEND FOR CATALOGUE.

### JEFFREY CHAIN BELTING.

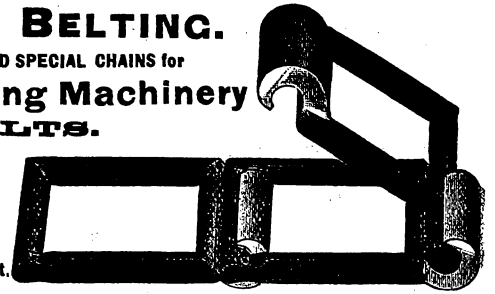
Also MALLEABLE, WROUGHT, STEEL AND SPECIAL CHAINS for  
Elevating and Conveying Machinery  
**DRIVE BELTS.**

Send for Illustrated Catalogue and Reduced Price-List.

THE JEFFREY MANUFACTURING CO

COLUMBUS, OHIO, U. S. A.

New York Branch, 163 Washington St.



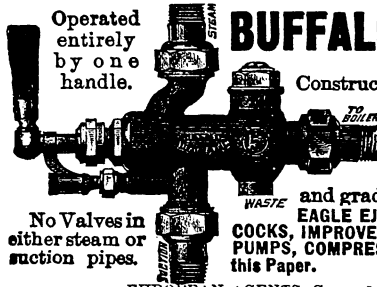
### DURANT COUNTING MACHINES

Received the Highest Award at the  
World's Columbian Exposition.



Send for  
Catalogue  
to

W. N. DURANT, 234 22d St., Milwaukee, Wis.



### BUFFALO AUTOMATIC INJECTOR

A GRADING INJECTOR.

Construction and operation is such that water supply is always in proportion to supply of steam admitted and can be graded to feed continuously with steam from 20 to 140 pounds. Works perfectly whether lifting or taking supply from city pressure. Operated entirely by one handle, both in stopping and starting and grading supply of steam and water.

No Valves in  
either steam or  
suction pipes.

EAGLE EJECTORS, DUPLEX FLUE SCRAPPERS, FETTHOUSE GAUGE COCKS, IMPROVED GLASS OIL CUPS AND LUBRICATORS, CYLINDER OIL PUMPS, COMPRESSION GREASE CUPS, Etc. Send for Catalogue. Mention this Paper.

SHERWOOD MFG. CO., Buffalo, N. Y.

EUROPEAN AGENTS, Green & Boulding, 21 Featherstone St., London, E. C.

### FOR THE "Double Triple Quick Stroke" SHAPER

WRITE TO

GOULD & EBERHARDT, Newark, N. J.



18 in., 16 in., 20 in., 24 in., 26 in., 30 in. stroke.

### GOULDS PUMPS



### For Spraying

The necessity and benefits of Spraying fruit trees, grape vines, &c., &c., are so generally recognized to-day that no hardware or agricultural stock is complete without Spray Pumps. We have Stationary, Portable and Knapsack Pumps and Special Spray Nozzles to meet every requirement. Can furnish everything ready for use. Send for special Spray Pump Catalogue.

### THE GOULDS MANUFACTURING CO.,

Manufacturers of PUMPS and HYDRAULIC MACHINERY,  
Works & Main Offices: Seneca Falls, N. Y., U. S. A. Warehouses: 16 Murray St., New York City.  
Or Nearest Branch Agency—THE GOULD CO., 22 and 24 North Canal St., Chicago, Ill.  
SMITH & WINCHESTER CO., 19 to 37 Wendell St., Boston, Mass. WOODIN & LITTLE, 312 & 314 Market St., San Francisco, Cal.  
N. O. NELSON MFG. CO., Eighth & St. Charles Streets, St. Louis, Mo. L. M. BATES, 321 Vine Street, Philadelphia, Pa.

FOR TESTING IRON  
AND STEEL SPECI-  
MENS, CAR COUPLERS,  
BRAKE SHOES, CHAIN,  
SPRINGS, WIRE, CE-  
MENT.

## RIEHLE TESTING MACHINES,

Hydraulic Pumps and  
Presses, Robie Jacks,  
Marble Machinery, Iron  
Founders & Machinists.  
Riehle Bros. Testing  
Machine Co.,  
8th St. abv. Master Phila.

HOUSE ESTABLISHED 1827.

OLDEST AND LARGEST OF THE KIND IN THE WORLD.

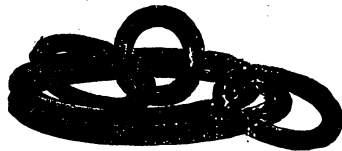
Miners, Importers and Manufacturers of

**GRAPHITE, PLUMBAGO, BLACK LEAD,  
FOR ALL PURPOSES.****DIXON'S  
PLUMBAGO  
FACINGS**

CALLED

**India Silver Lead.**

FOR SAMPLES AND PRICES ADDRESS

**JOS. DIXON CRUCIBLE CO.,  
JERSEY CITY, N. J.****RUBBER GOODS**

MOULDED

Small moulded work a specialty.  
Send for estimates for moulds and work.

FOR MECHANICAL PURPOSES.

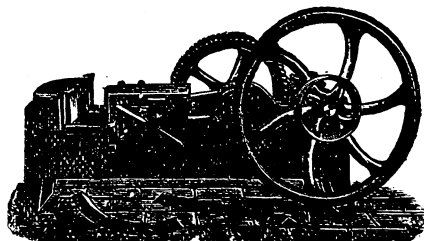
H. O. CANFIELD, Bridgeport, Conn.

**PITTSBURGH MFG. CO.**

Manufacturers of

**Crosgrove's Patent Straight-  
ening, Bending and Punch-  
ing Machines.****NAIL MACHINERY.**

Bolts, Nuts, Rivets, Castings, &amp;c.

**PITTSBURGH, . . PA.****LEVIATHAN BELTING.**Positively un-  
equalled for  
Strength, Dura-  
bility and Trac-  
tion Power; un-  
affected by Heat,  
Steam or Water.Belts for Main  
Driving and work  
of a heavy nature  
a specialty.**MAIN BELTING  
COMPANY,**Sole Manufacturers,  
1249-1235 Carpenter St.  
PHILADELPHIA

248 Randolph Street, Chicago.

120 Pearl Street, Boston.

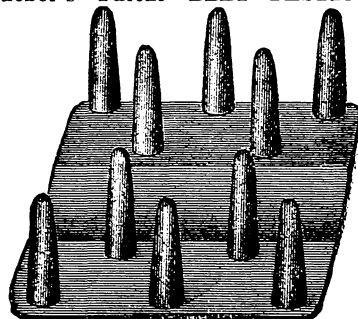
Send for Price-Lists and Samples.

**ALEXANDER BROS.  
BEST OAK BELTING.**

PHILADELPHIA.

Patterson, Gottfried & Hunter, Limited, agents,  
146-150 Centre St., New York, N. Y.

Thacher's Patent BELT FASTENERS

Manufactured by  
The Claffen Manufacturing Co., Cleveland, O.  
Office, 71 and 73 Ontario St.**"RUBY" PACKING****MAKES**

A temporary or a permanent, steam, air or water joint,

**A JOINT****THAT WILL BE TIGHT AND STAY TIGHT.**

CAN BE USED OVER AND OVER AGAIN.

SEND  
FOR  
CIRCULAR.1846-PARA,  
DOUBLE DIAMOND,  
CARBON,

TRADE-MARKS on

BELTING,  
PACKING,  
HOSE,  
GASKETS, ETC.,

are a guarantee of

DURABILITY,  
QUALITY,  
RELIABILITY.SEND-  
FOR  
CIRCULAR.**NEW YORK BELTING & PACKING CO. LTD**

PIONEERS AND LEADERS,

15 PARK ROW, NEW YORK.

C

**E. W. BLISS CO.,**11 ADAMS ST., BROOKLYN, N. Y.  
Western Office, 100-104 W. Washington St., Chicago.

"BLISS" HORIZONTAL BORING MILLS Nos 210 and 211.

Presses,

Punches,

Shears,

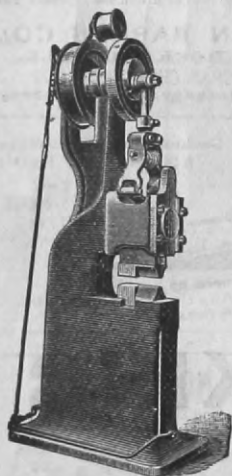
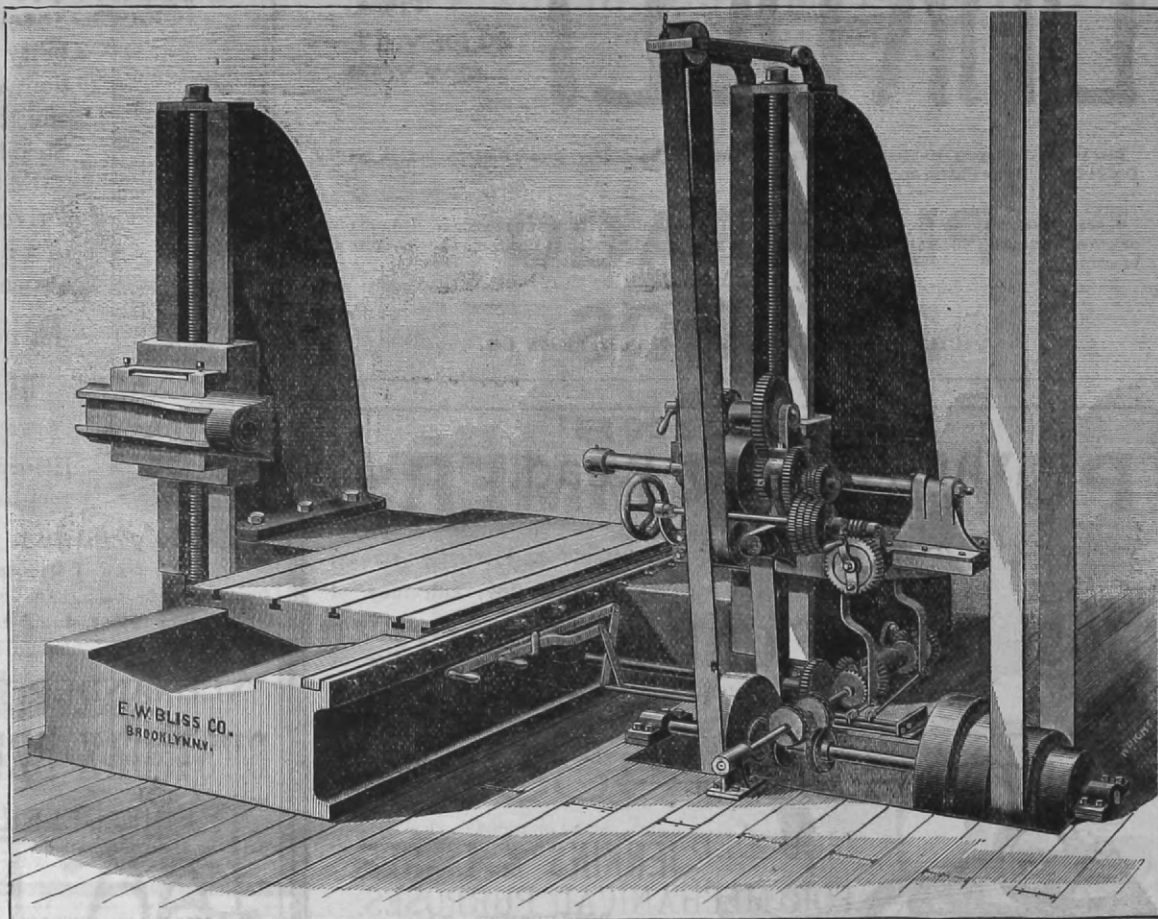
Drop

Hammers,

Dies and

Special

Machinery.

The Stiles  
& Parker  
Press Co.The Dupont Power  
Hammer.

## The Dupont Power Hammer

Is the only Power Hammer to buy in hard times, on account of its Low Cost, its Economy of Power, and Perfect Reliability.

Send for Descriptive Circular and Price-List.

**The Dupont Manufacturing Co.,  
ST. JOHNSBURY, VT.**

**A Practical Workshop Companion** for Tin, Sheet-Iron and Copper-Plate Workers. By LEROY J. BLINN. New revised, enlarged edition, with over 170 newly engraved illustrations; 296 pages; 12mo, cloth.....\$2.50

This deservedly popular book has been thoroughly revised and contains over 100 additional pages, with 170 newly engraved illustrations. The volume contains rules for describing various kinds of Patterns used by Tin, Sheet-Iron and Copper-Plate Workers; Practical Geometry; Mensuration of Surfaces and Solids; Tables of the Weights and Strengths of Metals and other Materials; Tables of Areas and Circumferences of Circles; Composition of Metallic Alloys and Solders, with numerous valuable Receipts and Manipulations for every-day use in the workshop.

Sent, postpaid, on receipt of price, by  
DAVID WILLIAMS, Publisher and Bookseller,  
96-102 Reade St., New York.

Wire Drawing Machines, **WATERBURY**  
Gang Slitters,  
**MACHINE CO.,**  
Power Presses and Dies, Waterbury, Conn.  
Tumbling Barrels, MANUFACTURERS.  
Special Machinery.

Send For Prices.



# LINK-BELT

ENGINEERING CO.  
NICETOWN,  
P.H.A.  
49 DEY ST.  
NEW YORK

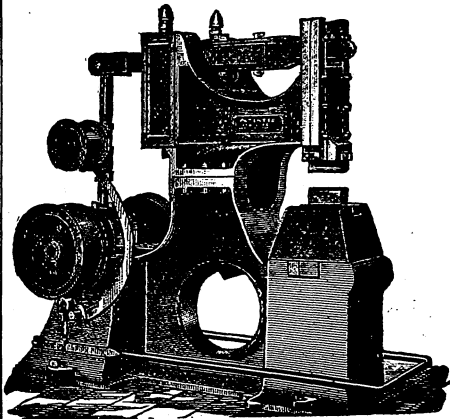
Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting, Dodge Chain, Howe Chain, &c.

General Eastern Agents for Fibre-Graphite Journal Bearings for shafting and machines. Require no oil or other lubricant. Moderate in price, durable and guaranteed. Bearings furnished to fit hangers now in use.

WESTERN CONNECTION

[CHICAGO,] LINK BELT MACHINERY CO.

## JENKINS' POWER HAMMERS.

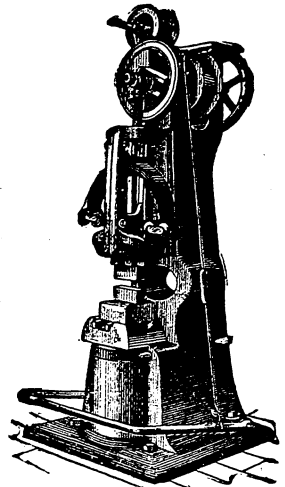


Adjustable and elastic stroke, nicety of regulation, efficiency of action, simplicity and durability of construction and the absence of leather straps, steel springs and all complication, combine to make this hammer the favorite wherever used.

JENKINS & LINGLE,  
BELLEFONTE, PA.

## IF YOU USE Power Hammers

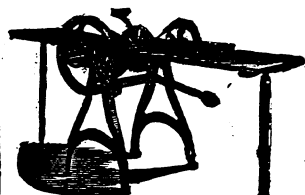
Write to us for Circulars.  
SCRANTON & CO.,  
NEW HAVEN, CONN.



N. Y. Office, 15 Murray St.,  
Surpluss, Dunn & Alder.  
Chicago Office, 60 S. Canal St. H. O. Skinner.  
Philadelphia Office, 1113 Arch St,  
Edwin L. McConaughy.

### BARNES

Hand and Foot Power Machinery,  
FOR CARPENTERS AND BUILDERS.

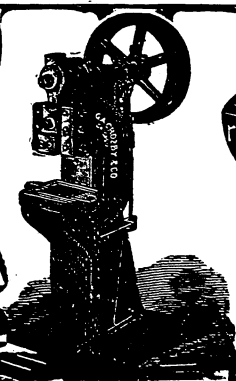


Complete Line  
of Seven  
Machines.  
Hand Circular  
Rip Saw  
Combined Rip and  
Cross-Cut Saw  
(with Scroll Saw  
and Boring At-  
tachments).  
Scroll Saw, For-  
mer, Mortiser,  
Tenoner & Lath

Discounts to the trade on application. Send for  
Catalogue and Price-List.

W. F. & JOHN BARNES CO.,  
69 Ruby Street, ROCKFORD, ILL.  
ENGLISH AGENTS, CHAS. CHURCHILL & CO.,  
21 Cross Street, Finsbury, E. C., London.

GA. CROS  
Manufacture  
PRESSE  
SPECIAL MA  
SHEET METAL  
176 178 So. Clinton

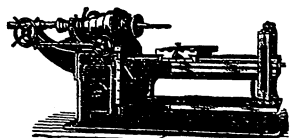


BY CO.  
rs of  
S. DIES  
CHINERY  
WORKERS  
St. Chicago, Ill.

## FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

FITCHBURG  
AND OTHER

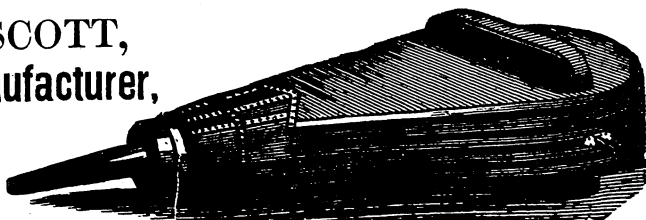


Horizontal Boring and Drilling  
Machine.

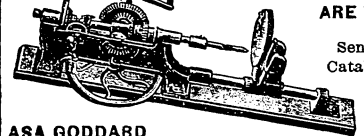
ENGINE LATHE  
METAL-WORKING MACHINES.  
FITCHBURG,  
MASS.

SEND FOR  
CATALOGUE B.

GEO. M. SCOTT,  
Bellows Manufacturer,  
Johnson Street  
Cor. 22d St.,  
CHICAGO, ILL.



The Goddard and Columbia  
Blacksmiths' Drills



ARE THE  
BEST.  
Send for  
Catalogue.

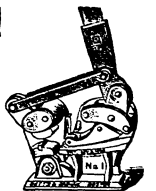
ASA GODDARD  
Manufacturer  
Worcester, Mass.

## SECURE AGENCY NOW!

The B. & O. Sure Grip Tire Up-  
setter is being pushed  
among Blacksmiths and  
IT SELLS.

Every machine is tested and  
warranted. Send for Price.

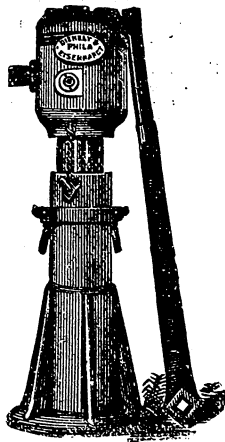
9UTTS & ORDWAY,  
500 Atlantic Ave., Boston, Mass.



DRILL PRESSES  
MERS. OF  
THE LARGEST  
VARIETY  
SEND FOR NEW  
30 PAGE CATALOGUE  
JUST OUT  
DWIGHT SLATE  
MACHINE CO.  
HARTFORD, CONN.

**RELIANCE HYDRAULIC JACKS.**

SUPERIOR TO ANY JACK NOW MADE.  
Absolute in its actions in any position.  
Under complete and instantaneous control.



MADE IN FOUR SIZES,  
10, 15, 20 and 30-ton capacity, to lift 12 or  
18 inches. Broad Base or Ground Lift.

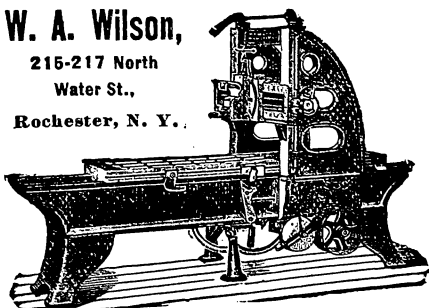
**DIENELT & EISENHARDT,**  
MAKERS,

1308 Howard Street, Philadelphia.

**W. A. Wilson,**

215-217 North  
Water St.,

Rochester, N. Y.



Improved Iron Planers a specialty. 20 x 20, 22 x 22,  
24 x 24 up to 42 x 42, to plane any length. Send for  
description and price-list before purchasing. Manu-  
facturers' agent for other tools and machinery. Men-  
tion *The Iron Age*.

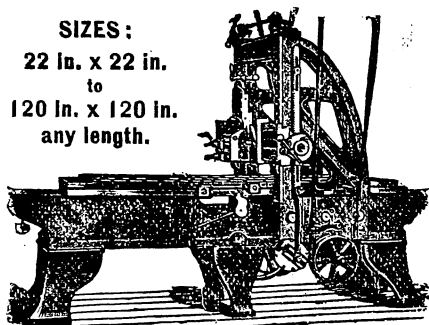
**THE POWELL PLANNER CO.**

SIZES:

22 in. x 22 in.

to

120 in. x 120 in.  
any length.



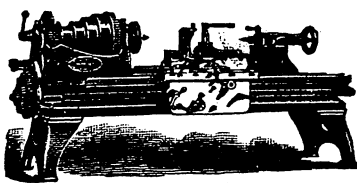
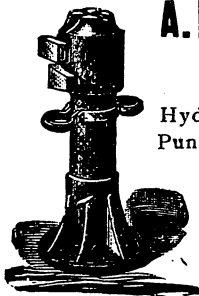
WORCESTER, MASS.

**A. L. HENDERER**

Wilmington, Del.

MANUFACTURER OF

Hydraulic Jacks, Hydraulic  
Punches, Screw Punches,  
Steel Tube Expand-  
ers, Flue Hole Cut-  
ters, Boiler Test  
Pumps and Pipe  
Vises.

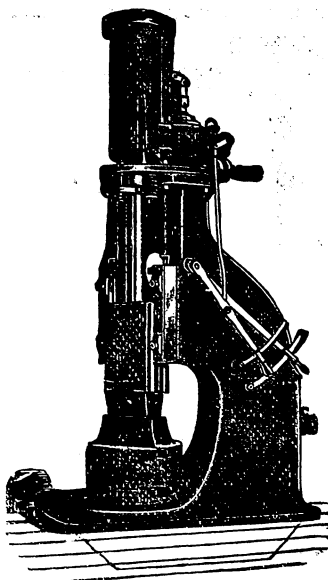


**NEW HAVEN MANUFACTURING CO.**  
NEW HAVEN, CONN.

Manufacturers of

**IRON-WORKING MACHINERY**

Planers, Shapers, Drills, Slotters, Etc.



**Bement, Miles & Co.,**

PHILADELPHIA, PA.,

Builders of

## Metal-Working Machine Tools

For railroad shops, locomotive and car builders,  
machine shops, steam forges, shipyards, boiler  
shops, bridge works.

**Steam Hammers for Working Iron  
or Steel.**

NEW YORK OFFICE, Equitable Building.

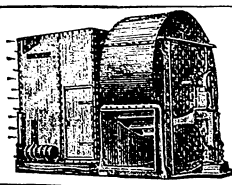
GEORGE PLACE, Agent.

## Heat Your Works

WITH THE

# STURTEVANT SYSTEM.

THE STURTEVANT  
PATENT HOT BLAST  
STEAM HEATING  
APPARATUS  
COMBINED STEAM FAN & HEATER  
FOR VENTILATING AND DRYING  
SEND FOR  
CATALOGUES. B. F. STURTEVANT &  
NEW YORK BOSTON MASS PHILA. CHICAGO LONDON



IF YOU WANT ANYTHING IN THE LINE OF  
**DROP PRESSES · DROP HAMMERS ·  
STAMPS OR AUTOMATIC  
DROP LIFTERS**

SEND FOR CATALOGUE TO

*Miner & Peck Mfg. Co.*  
New Haven, Conn.  
LARGEST LINE IN THE MARKET.

Engravings Show the Style of Die  
Head which the

**Bignall & Keeler Mfg. Co.,**

ST. LOUIS, MO.,

PLACE ON THEIR

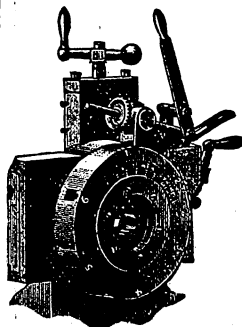
PEERLESS AND DUPLEX

Pipe Threading & Cutting Machines.

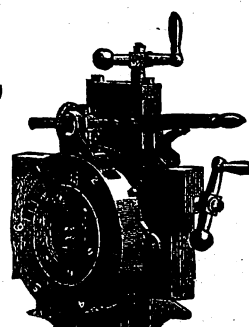
Write for Prices on the

Most Perfect and Economical Line  
of Machines on the Market.

Mention *The Iron Age*.



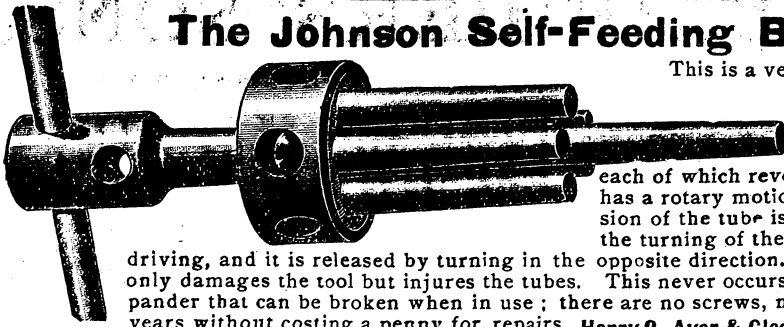
"Peerless" Head showing  
dies expanded



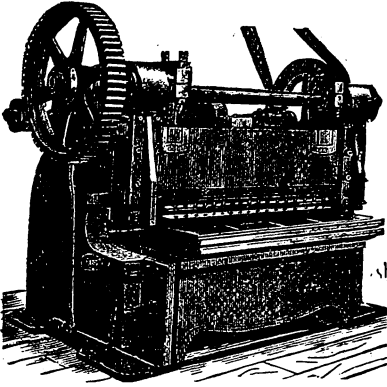
"Peerless" Head showing  
dies closed.



## The Johnson Self-Feeding Boiler Tube Expander.



This is a very simple and efficient tool ; it is constructed on correct mechanical principles, and it does its work more effectively and in less time than any other expander made ; it will outwear three similar tools of any other manufacture. There are five small rollers, each of which revolves when the centre pin is turned and the tool itself has a rotary motion which produces a uniform pressure and the expansion of the tube is perfect ; the small rollers being started at an angle, the turning of the centre pin feeds the expander into the tube without driving, and it is released by turning in the opposite direction. The driving of the centre pin of an expander not only damages the tool but injures the tubes. This never occurs with the JOHNSON TOOL. There is no part of this expander that can be broken when in use ; there are no screws, no casings, no rollers on pivots. It will wear for years without costing a penny for repairs. Henry C. Ayer & Gleason Co., N. E. Cor. 2d and Diamond Sts., Central Office, No. 919 Betz Bldg., PHILADELPHIA, PA.

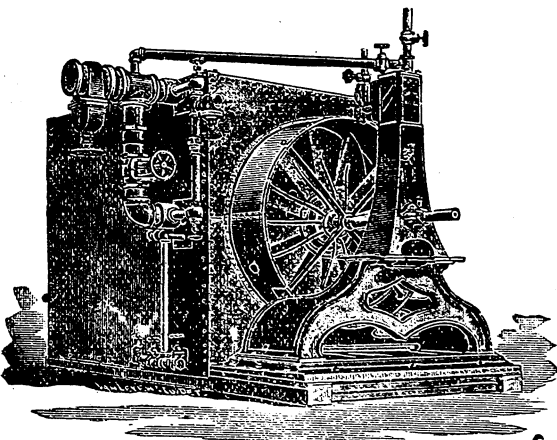


## PUNCHES & SHEARS

Double, Single, Multiple, Horizontal, Belt and Steam driven. Bending and Straightening Rolls, Spacing Tables, Doublers for Sheet and Tin mills. Sheet Metal Working Machinery of every description. Send for complete catalogue.

The Wais & Roos Punch and Shear Co.,

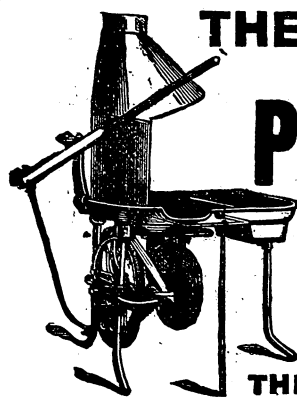
456-460 Plum St., Cincinnati, O.



For Heating  
Schools,  
Churches,  
Factories,  
Stores,  
Machine and  
Railroad Shops.

Boston,  
Chicago,  
New York.

HUYETT & SMITH MFG. CO., DETROIT, MICH.



## THE CYCLONE PORTABLE FORGES

Have Double Ratchet, Solid Frame, Adjustable Legs, Detachable Lever. Run Lightest, Make Strongest Blast & Last Longest. ALL DESIRABLE STYLES AND SIZES. Sold by Hardware and Machinery Dealers everywhere. Send for Catalogue of these and Hand & Power Blower, Blacksmith Drill Presses, &c. THE FOOS MFG. CO. SPRINGFIELD, OHIO.

## Ferracute Machine Co.

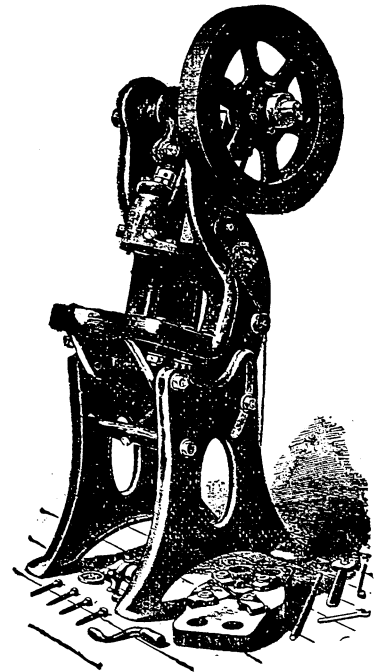
BRIDGETON, N. J., U. S. A.,

MANUFACTURERS OF

FOOT AND POWER

## PRESSES, DIES,

AND ALL OTHER  
Tools for Bar and Sheet Metals.



Send for Illustrated Catalogue containing sizes, weights and prices of one hundred kinds of Presses and other Tools for Brass Goods, Locks, Hardware, Nuts, Washers, Drop Forgings, Railroad, Bridge and other General Machine Shop Work, &c. Also for Tinware, Cans, Boxes, Lamps, Gas Fixtures and Silverware, &c., &c.

Magical Experiments ; or, Science in Play. By ARTHUR GOOD. Translated by CAMDEN CURWEN and ROB WATERS. The experiments explained include some designed merely for recreation, with many really scientific in character. These latter are given with a view of stimulating an interest in the study of physics. 329 pages, illustrated, 8vo, cloth. \$2.00.

For Sale by David Williams, 96-102 Reade St., N. Y.

## JOHN ADT & SON,

New Haven, Conn.

BUILDERS OF MACHINERY for HARDWARE MANUFACTURE.

BUTT MILLING MACHINERY,

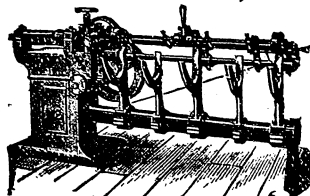
BUTT DRILLING MACHINERY,

RIVETING MACHINES,

WIRE STRAIGHTENING  
MACHINERY,

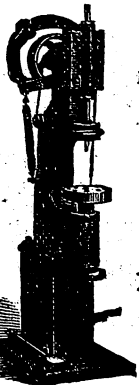
FOOT PRESSES,

SPRUE CUTTERS,  
ETC.



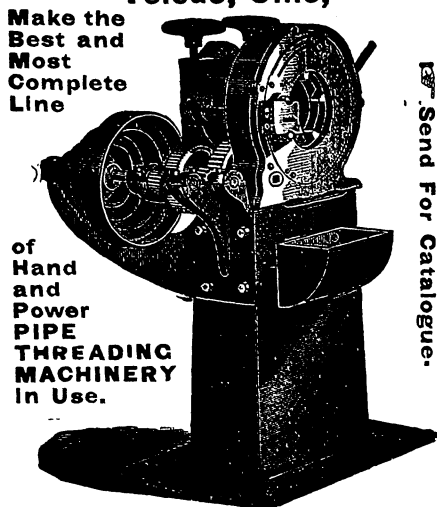
Automatic Wire Straightening and Cutting Machine.

Elastic Rotary-Blow Riveting Machine.



The Merrill Manufacturing Co.,  
Toledo, Ohio,

Make the  
Best and  
Most  
Complete  
Line

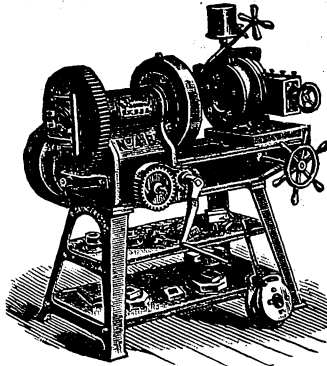


of  
Hand  
and  
Power  
PIPE  
THREADING  
MACHINERY  
In Use.

Send For Catalogue.

## D. SAUNDERS' SONS,

MANUFACTURERS OF



## PIPE Cutting AND Threading MACHINES

All sizes  $\frac{1}{4}$  inch to 16 inch for Pipe Mill,  
Gas and Steam Fitters' use. Tapping  
Machines for steam-fittings, also

STEAM and GAS FITTERS' HAND TOOLS.

SEND FOR CATALOGUE.

No. 4 B Machine,  $\frac{1}{4}$  to 4 inch. Hand or Power. No. 25 Atherton St., Yonkers, N. Y.

## HYDRAULIC JACKS.

ALL SIZES. ALL STYLES. ALL WARRANTED.

## HYDRAULIC PRESSES,

PUMPS, ACCUMULATORS, VALVES, GAUGES, FITTINGS, &c.

SEND FOR CATALOGUE E.

WATSON & STILLMAN,

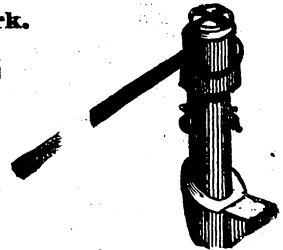
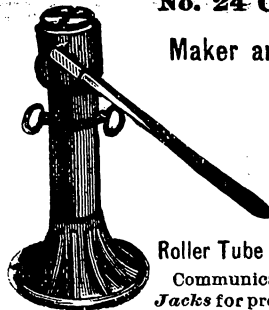
204-210 E. 43d St., New York.

## RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

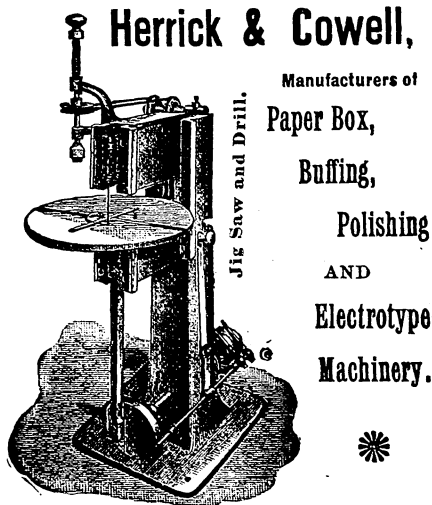
Hydraulic Jacks  
AND  
Punches.



Roller Tube Expanders and Direct Acting Steam Hammers

Communication by letter will receive prompt attention.

Jacks for pressing on Car Wheels or Crank Pins made to order.



Herrick & Cowell,

Manufacturers of

Paper Box,

Buffing,

Polishing

AND

Electrotype

Machinery.



NEW HAVEN, - CONN.

SEND FOR CATALOGUE.

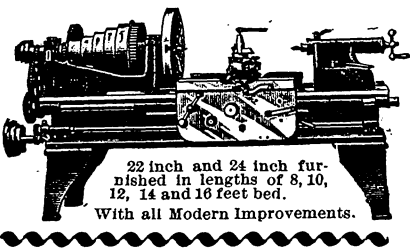
Dietz, Schumacher & Co.,

Cincinnati, Ohio, U. S. A.

## Radial Drills.

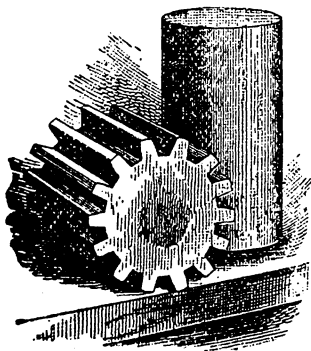
The best is the Cheapest. We make the best.

## Eng. Lathes.



22 inch and 24 inch fur-  
nished in lengths of 8, 10,  
12, 14 and 16 feet bed.  
With all Modern Improvements.

## HYDRAULIC FORGING.



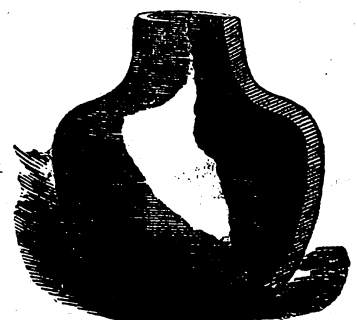
Billet and Patent Hot-Pressed  
Steel Pinion.

Steel Bottles, Air and Gas Receivers  
drawn from Solid Steel or Plates,  
Crank Shafts, Straps, Wrists, Pins,  
Irregular Shapes, Discs, Cups,  
Boiler Heads, Steel Flanges  
for High Pressure Steam,  
Drawn Steel Tubing for Bi-  
cycles, Boilers, Etc.

THE UNITED STATES PROJECTILE CO.,

1st Ave. and 53d St., Brooklyn, N. Y.

CORRESPONDENCE SOLICITED.



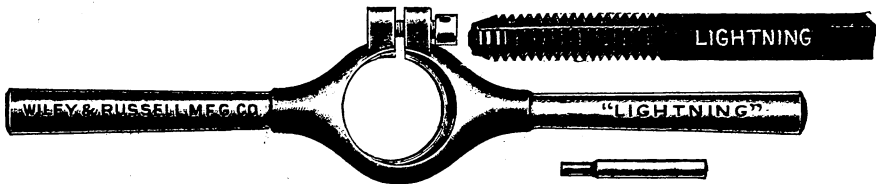
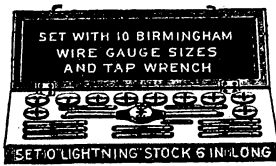
Steel Bottles, any thickness or shape.

# "Lightning" Bicycle Screw Plates.

Adjustable Dies with Case-Hardened Guides.

BIRMINGHAM ("STUBS") WIRE GAUGE SIZES.

SEND FOR SUPPLEMENT No. 1.



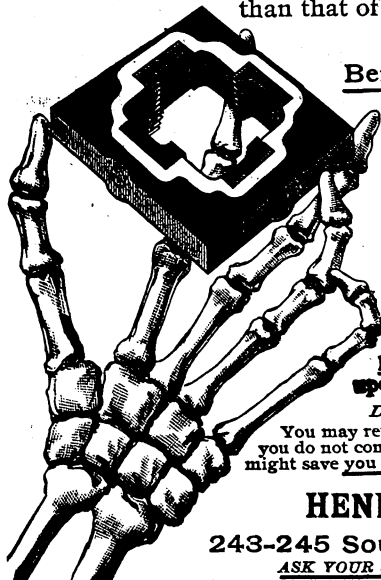
WILEY & RUSSELL MFG. CO., Greenfield, Mass., U. S. A.

New York Agency for Wiley & Russell. 120 Liberty St.

## Maule's "Skeleton" Pipe Die

Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

**1**  
The First Cost to you of MAULE'S "SKELETON" PIPE DIE is less than that of any other Pipe-Threading Die—and



**2**  
Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

A sample One-inch "Skeleton" Pipe Die, either  $2\frac{3}{4}$  or  $2\frac{1}{2} \times \frac{3}{4}$  thick, by mail, postage prepaid, will cost you 62 cents, and will be sent upon receipt of a Postal note for that amount.

DO NOT SEND US ANY POSTAGE STAMPS.

You may return such sample to us, at our expense, if, after seeing it, you do not consider it worth the price. Don't the above sound as if it might save you some money—if TRUE?

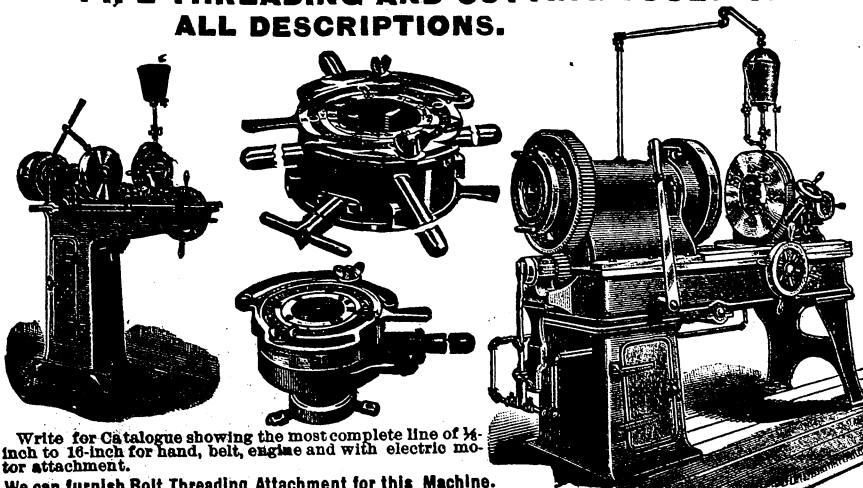
HENRY B. PANCOAST & CO.,

243-245 South 3d Street. Philadelphia, U. S. A.

ASK YOUR JOBBER WHAT HE KNOWS ABOUT THIS TOOL.

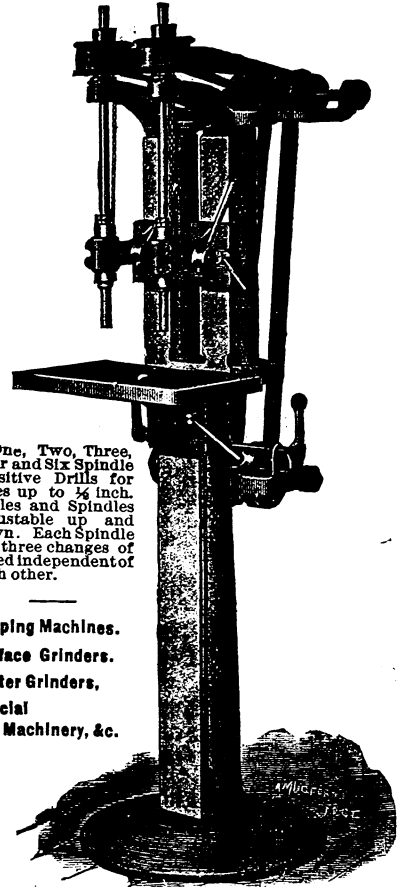
## JARECKI MFG. CO. (Limited), Erie, Pa.

PIPE THREADING AND CUTTING TOOLS OF ALL DESCRIPTIONS.



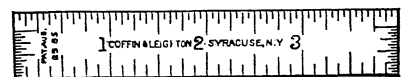
Write for Catalogue showing the most complete line of  $\frac{1}{4}$ -inch to 16-inch for hand, belt, engine and with electric motor attachment. We can furnish Bolt Threading Attachment for this Machine.

## Woodward & Rogers, HARTFORD, CONN.



One, Two, Three, Four and Six Spindle Sensitive Drills for holes up to  $\frac{1}{4}$  inch. Tables and Spindles adjustable up and down. Each Spindle has three changes of speed independent of each other.

Tapping Machines.  
Surface Grinders.  
Cutter Grinders.  
Special Machinery, &c.



**MACHINISTS' SCALES.**  
PATENT END GRADUATION.  
Liberal Discount to the Trade. Send for List.

COFFIN & LEIGHTON, Syracuse, N. Y.

"The Iron Founder" Supplement.

A Complete Illustrated Exposition of

## THE ART OF CASTING IN IRON,

COMPRISING THE

Erection and Management of Cupolas, Reverberatory Furnaces, Blowers, Dams, Ladles, Etc.; Mixing Cast Iron; Founding of Chilled Car Wheels; Malleable Iron Castings; Foundry Equipments and Appliances; Gear Molding Machines; Molding Machines; Burning, Chilling, Softening; Annealing; Pouring and Feeding; Foundry Materials; Advanced Molding; Measurement of Castings; Wrought Iron, Steel, Etc.; also the Founding of Statues; the Art of Taking Casts; Pattern Modeling; Useful Formulas and Tables.

—BY—

**SIMPSON BOLLAND,**

Practical Molder and Manager of Foundries; Author of "The Iron Founder," etc.

Illustrated with over Two Hundred Engravings.

400 Pages. 12mo, cloth, \$2.50.

Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade St., New York.

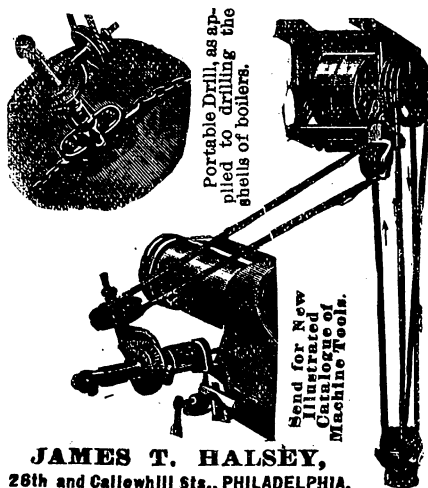
## FRICITION CLUTCHES, SHAFTING, HANGERS, PULLEYS.

Sheaves for Rope Driving.  
Gear Wheels.

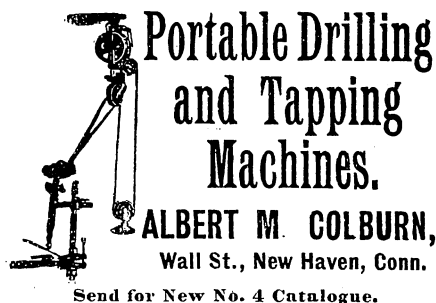
### FRICITION PULLEYS.

## KEYSTONE CLUTCH AND MACHINE WORKS,

1708-1710 Germantown Ave.,  
PHILADELPHIA, PA.



JAMES T. HALSEY,  
26th and Callewhill Sts., PHILADELPHIA.



### REECE'S PATENT HAND BOLT CUTTER OR SCREW PLATE.



Send for new catalogue of  
**SCREW CUTTING TOOLS.**  
EDWARD F. REECE, Mfr., GREENFIELD, MASS



### SKINNER PATENT CHUCKS.



### Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mill, the forge and the foundry. By W. H. GREENWOOD, \$2.00. Sent, postpaid, on receipt of price by DAVID WILLIAMS, Bookseller and Publisher, 96-102 Reade Street, New York.



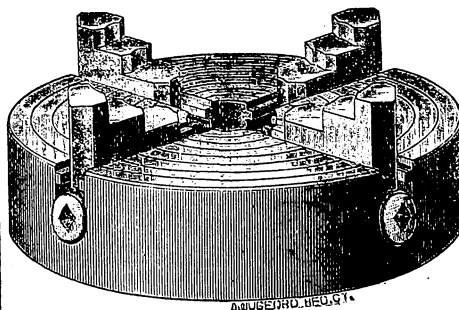
## "CUSHMAN" CHUCKS.

For Lathes, Drills, Chucking and Screw Machines, and for special use.

SEND FOR CATALOGUE.

## The Cushman Chuck Co., Hartford, Conn.

### CHAMPION INDEPENDENT CHUCKS.



An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

### THE D. E. WHITON MACHINE CO.

Sole European Agents, SELIG SONNENTHAL & CO., LONDON. New London, Conn.



Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all. Write for catalogue.

CHAMPION BLOWER & FORGE CO., - - LANCASTER, PA.



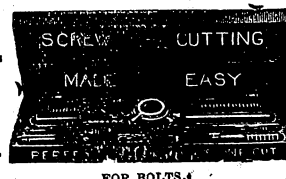
### THE ADJUSTABLE "DUPLEX" DIE STOCK.

Quick. Accurate. Durable.

15,000 now in use.

HART MANUFACTURING CO.

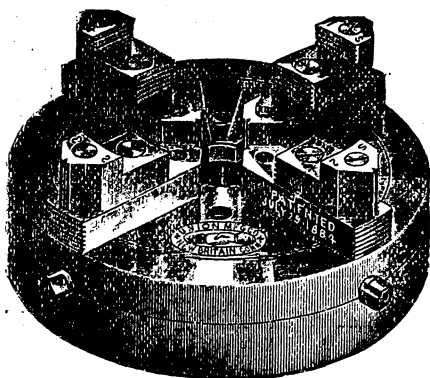
CLEVELAND, O., U. S. A.



**UNION MANUFACTURING COMPANY, NEW BRITAIN, CONN.**

WAREHOUSE, 108 CHAMBERS ST., NEW YORK.

Manufacturers of Combination Chucks, Universal Chucks, Independent Chucks, Combination Reversible Jaw Chucks, Car Wheel Chucks, &amp;c., &amp;c.

**Union Chuck No. 21.**

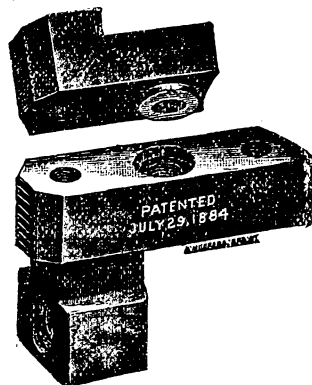
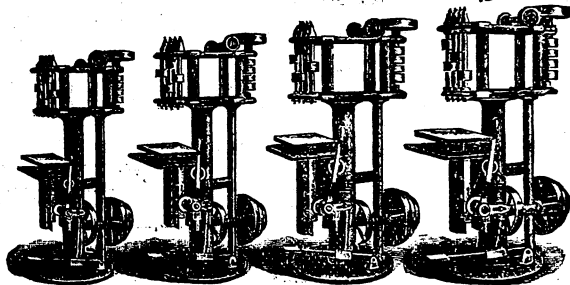
Combination with Reversible Jaws.

ALSO

Showing Sectional Cut of Jaw.

We guarantee our Chucks in every particular.

WRITE FOR CATALOGUE AND PRICE-LIST.

**PRATT & WHITNEY CO., Hartford, Conn., U. S. A.**

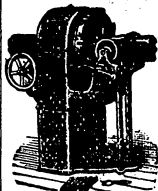
Manufacture Gang Drills of improved design, with two, three, four and six spindles, in four sizes. The spindles are made of tool steel, have steel boxes hardened and ground, with provision for adjustment for wear. Tables are counterbalanced.

Drilling Machines of many styles in Stock.

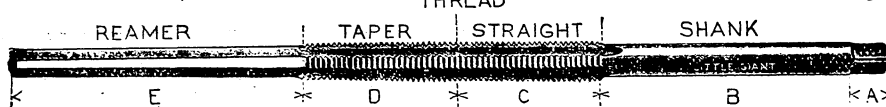
ASK FOR "HARDWARE" CATALOGUE.

**THE ARMSTRONG MFG. CO.,**

—Bridgeport, Conn.—

Pipe Threading  
AND  
Cutting-Off Machines.Stocks and Dies,  
Improved Hinged Vises, Pipe  
Wrenches, Pipe Cutters, &c.  
SEND FOR CATALOGUE.

NEW YORK OFFICE: 139 CENTRE ST.

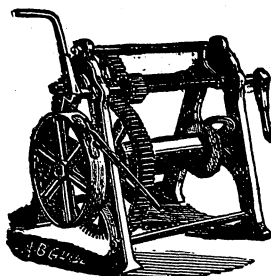
**STAY BOLT TAPS.**

We Make a Specialty of this Style of Tap.

CUT THIS OUT, mark  
Description of TAPS  
used and send to us  
for prices.**WELLS BROS. & CO.,** GREENFIELD,  
MASS., U. S. A.BUSINESS ESTABLISHED  
1798.INCORPORATED  
1801.**JOS. F. McCOY CO.,**

26 Warren St., New York,

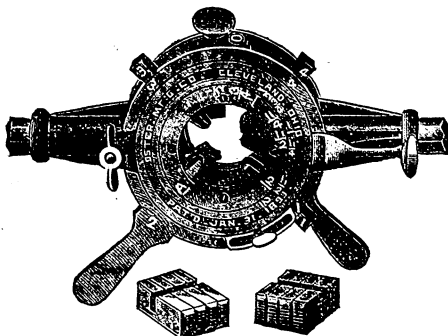
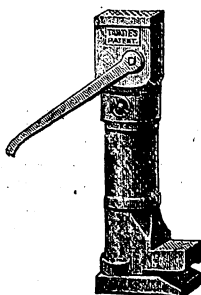
HEADQUARTERS FOR

Hoisting  
Crabs,

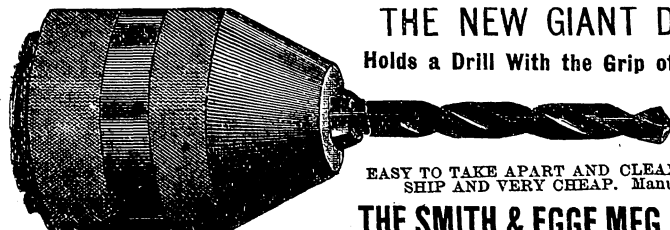
ALL IRON.

SIZES:  
½ ton to 70  
tons.**Tangye's  
Hydraulic  
Jacks.**

SIZES:

4 tons to 200 tons. Lifts  
on foot or top.The Oster Patent Adjustable Die Stocks,  
with Patent Adjustable Positive Stop  
and Cut-Off,Are built, sold and warranted as the best  
hand tools for threading and cutting off pipe.  
They are complete in themselves; no hammer,  
wrench or other tools required. They are easier  
to operate, have less weight, more strength  
and do a larger range of work and more of  
it in a given time than any in the market.  
They have all the merits of perfect tools in ma-  
terial, construction and finish. They are fur-  
nished at popular prices by wholesale  
dealers throughout the world. Boxed singly  
with full printed instructions.Write for Prices and Discounts to  
**The Oster Mfg. Co.,**

CLEVELAND, OHIO, U. S. A.

**THE NEW GIANT DRILL CHUCK.**Holds a Drill With the Grip of a Giant. All Steel  
Parts Interchangeable.  
**SIMPLE IN CON-  
STRUCTION.**EASY TO TAKE APART AND CLEAN. BEST OF WORKMAN  
SHIP AND VERY CHEAP. Manufactured and sold by**THE SMITH & EGGE MFG. CO.,** Bridgeport, Conn.

# THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

Increase Twist Drills, Reamers, Taps, Milling Cutters and Chucks.

Taper Shank  
Drills,  
St. Shank Drills,  
Screw-driver  
Bits,  
Reamers,  
Shell and Solid  
Taper Reamers.



Bit Stock Drills for Metal or Wood.



Wood-Boring Brace Drills, will cut off nails.

Hand Taps,  
Mach. Screw Taps  
"Standard" Drill  
Chuck,  
"Ellenwood" Drill  
Chuck,  
Sq. Shank Drills  
for Ratchets,  
Twist Drills for  
Blacksmiths'  
Presses

Sockets for  
Taper Shank  
Drills.

Reamers in  
all sizes.

NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue.

1874.

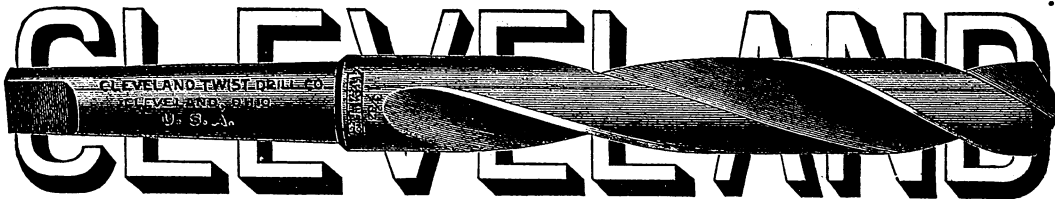
OLD RELIABLE.

1894.

SEND

FOR

CATALOGUE.



WRITE

FOR

DISCOUNTS.

Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.



They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

STOW FLEXIBLE SHAFT,



Invented and  
Manufactured by  
**THE**

**STOW MFG. CO.,**  
Established 1875. Binghamton,  
N. Y.

**PORTABLE,**  
DRILLING  
TAPPING,  
REAMING.

General European Agents,

**SELIG SONNENTHAL & CO.,**

85 Queen Victoria St.,

LONDON, ENGLAND.

MORSE TWIST DRILL &amp; MCH. CO.,



DRILLS, REAMERS, CUTTERS,



BEACH CHUCKS, TAPS, DIES.



Factory, NEW BEDFORD, MASS.

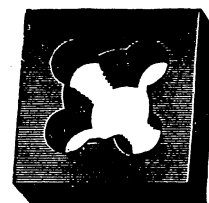
Catalogues on application.

MANNING, MAXWELL &amp; MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



Manufacture of Patent Machine Relieved Nut, Hand,  
Blacksmith and Machine Screw Taps, Screw Plates, Tap  
Wrenches and Patent Relieved Pipe Taps and  
Pipe Reamers; also of Solid Bolt and Pipe  
Dies. Furnished in V. U. S. Standard and  
Whitworth shape of threads.



111 Liberty Street,

NEW YORK.

Penn Elevator Engineering Co.,

MANUFACTURERS AND BUILDERS OF

HYDRAULIC AND DIRECT ELECTRIC PASSENGER ELEVATORS,

Also Steam, Belt and Hand Power Elevators of every description with Automatic Doors or Gates.

Philadelphia Agents for Keystone Motors and Dynamos.

Office and Salesrooms:

516 Commerce St., Phila.

Works: BLOOMSBURG, PA.

Stow Flexible Shaft Co., Limited,



6th, Callowhill & Biddle Sts.,  
PHILA., PA.,

Manufacturers of

**PORTABLE DRILLING,**  
TAPPING, REAMING,  
and BORING MACHINE

Also, Tools for Emery Wheel  
Grinding, Metal and Wood Pol-  
ishing, Cattle Brushing and  
Clipping, &c.

Gen'l European Agents,

Bolling &amp; Lowe,

2 Lawrence

Pountney Hill,

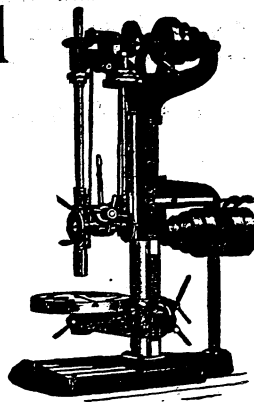
LONDON, ENG:



# A Burglar's Drill

is as unlike this in appearance as is the resemblance of a fine watch to a cheap 8-day clock, but the burglar's tool has many fine points. So has this. Write for particulars.

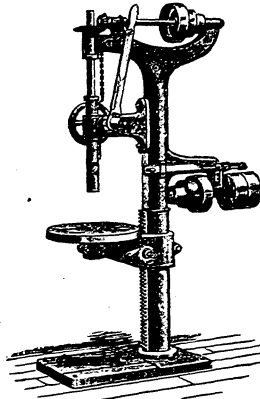
**THE HAMILTON MACHINE TOOL COMPANY,**  
WEST MARKET STREET,  
Hamilton, - Ohio, U. S. A.  
Western Store, 57 So. Canal St., Chicago.



# Machinists

taking pride in their work like to use good tools. The various Drills, Boring Machines and Turning Machines made by us are superior in many ways. Get catalogue and prices.

**BICKFORD DRILL & TOOL CO.**  
10 Lawrence St., CINCINNATI, O.

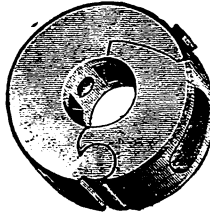
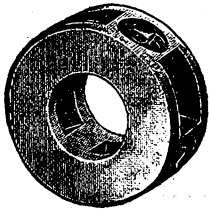


## SAFETY THRUST COLLARS.

— SOLID and SPLIT. —

Of character and at price to suit the most critical buyer. Dealers in shafting will consult their interests in writing for Price-List and Discounts.

**THE GOUVERNEUR MACHINE CO.,**  
Gouverneur, N. Y.



# MACHINERY FOR STONE WORKING

**LINCOLN IRON WORKS,**  
RUTLAND, VT.

New York Office, 182 Front Street

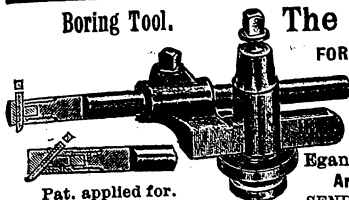
Stone Working Machinery, Planers, Gang Saws, Rubbing Beds, Derricks and Hoisting Powers, also Gear Castings. See list.

## KEEP POSTED

and you will know what is going on. Possibly you do not need a cutting-off machine just at present, but if you use one or ever expect to need one, you ought to know about the latest improvements, and we are the ones to tell you. We have some new tool blocks, an accelerated speed device and other things we would like to show you. Perhaps you have one of our machines; then you certainly should examine our latest style. We shall be only too glad to send you our circulars, list of users, photographs and prices. We hope you will feel interested enough to drop us a postal.

**HURLBUT-ROGERS MACHINE CO.,** So. Sudbury, Mass.

Boring Tool.



Pat. applied for.

## The Armstrong Tool Holders

FOR TURNING, PLANING AND BORING METALS.

Practical all-around, every-day tools. Drop Forged of Steel and finished in a first-class manner. Nearly 15,000 already in use. 200 working in The J. A. Fay & Egan Co.'s shops. Manufactured only by Armstrong Bros. Tool Co., 78 Edgewood Ave., CHICAGO, ILL.



Pat. Feb. 28, 1893.

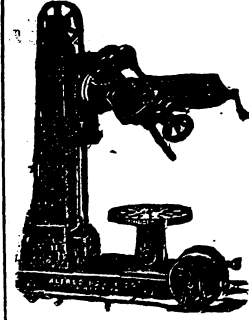
## Alfred Box & Co.,

Front, Poplar and Canal Sts., Philadelphia.

SOLE MANUFACTURERS OF

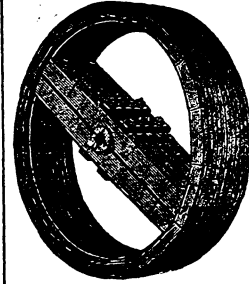
## BOX'S PAT. DOUBLE SCREW HOISTS

25,000 supplied in the United States exclusive of foreign trade; a record that tells its own story; a record of solid, substantial growth; extensive new works necessary to keep up with orders in our specialties; ample room now to build the heaviest class of Traveling and Jib Cranes of all sizes, Overhead Railways, Trolleys, Special Hoisting Gear for home-made Cranes; also our Patent Radial Drills and Gang Drills, as used by bridge builders. Estimates furnished with photos. Correspondence solicited, or visit our works.



## Wood Split Pulley.

Strongest,  
Lightest,  
Simplest,  
Cheapest



Wood split pulley in the world. Satisfaction guaranteed. Write for price-list and descriptive Catalogue. Address

**REEVES PULLEY CO.,**  
1220 E. 7th Street, COLUMBUS, IND.  
New York Agents,  
Patterson, Gottfried & Hunter, 148-150 Centre St.

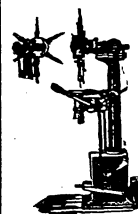
# ELEVATORS.

Hydraulic,  
Steam,  
Electric and Hand-  
for Passenger and  
Freight.

Any Carpenter can put them up.  
And any Hardware Dealer can make a splendid profit selling them.  
We also make a full line of Dumb Waiters and Lifts.

## The WARNER ELEVATOR MFG. CO.,

BRIGHTON STATION, CINCINNATI, O.



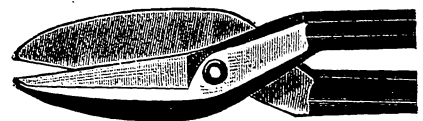
## QUINT'S TURRET DRILLS.

No. 2 Pattern.

This machine is made with from 2 to 12 spindles. All spindles driven direct by bevel gears. Only the spindle in use revolves. Will drill up to 3/4 inch. Address

A. D. QUINT, Hartford, Conn.

## Tools Cut in Two.



Special Offer for 60 Days.

## Tinners' Tools AND MACHINES

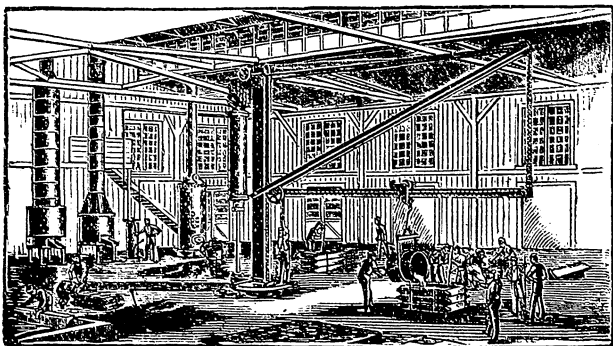
— AT —

## HALF PRICE,

To advertise valuable household patent. Address

**Peerless Cooker Co.,** Buffalo, N. Y.

# The Ridgway Steam-Hydraulic,



An Absolutely Perfect Crane!  
STRONG CLAIM BUT TRUE.

The J. I. Case Threshing Machine Co. of Racine, Wis., have recently erected one of the largest and finest foundries in the world. They equipped it with Ridgway Cranes. We asked them the other day how they liked the Cranes. Behold the reply:

RACINE, WIS., April 23, 1894.

CRAIG RIDGWAY & SON, Coatesville Pa.

GENTLEMEN:—Answering yours of the 21st in regard to the Cranes purchased from you, will say I fully agree with you in saying they are the BEST FOUNDRY CRANES ON EARTH TO-DAY. THERE IS NOT ONE OBJECTIONABLE FEATURE IN THEM. We have them in constant use. Our moulder's helpers operate them with perfect satisfaction.

I am yours truly,

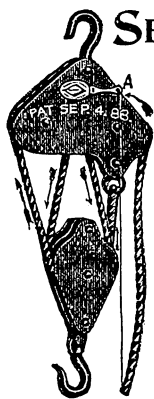
J. WALRATH, Supt. J. I. Case Co.

The Crane that is absolutely perfect for the exacting requirements of the foundry is the Crane for all places. We also make Steam-Hydraulic Elevators and Compressed Air Hoists.

**SEND FOR CIRCULARS.**

**CRAIG RIDGWAY & SON.**

**Coatesville, Pa.**



**SELL THE BEST.**

**THE "SURE GRIP" Steel Tackle Block**

is taking the place of all other hoisting blocks.

Send for catalogue and discount.

Fulton Iron & Engine Works,  
28 Brush St., Detroit, Mich.

ESTABLISHED 1852.

—OR—

Rice Lewis & Son, Ltd.,  
TORONTO, CAN.

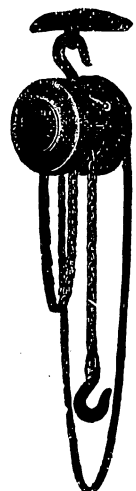


**J. A. FAY & CO.,**  
288 to 308 W. Front St., Cincinnati, Ohio, U. S. A

ORIGINATORS, INTRODUCERS AND CONSTRUCTORS OF  
**WOOD-WORKING MACHINERY**  
Of Every Description.

We captured all the "Honors" at the World's Fair for superiority.

Machines for any Want Supplied.  
Largest Line in the World



**Highest Efficiency.**

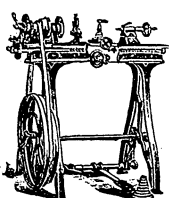
**WESTON'S NEW**

**TRIPLEX Chain Block**

far exceeds all predecessors. Send for Prof. Thurston's report of comparative tests of all chain pulley blocks.

**The Yale & Towne Mfg. Co.**  
STAMFORD, CONN.

New York, 84-86 Chambers St.  
Chicago, 152-154 Wabash Ave.  
Philadelphia, 1120 Market St.  
Boston, 224 Franklin St.



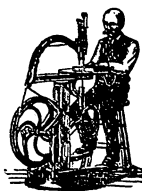
**Foot & Hand Power Machinery.**

Screw Cutting Lathes, Wood Turning Lathes, Scroll Saws, Circular Saws, Moulders, Mortisers, Etc.

Strictly High Grade. Catalogue Free.

**SENECA FALLS MFG. CO.,**  
255 Water St., Seneca Falls, N. Y., U. S. A.

London Agency, MESSRS. CHAS. CHURCHILL & Co., 21 Cross St., Finsbury, London, E. C., England.



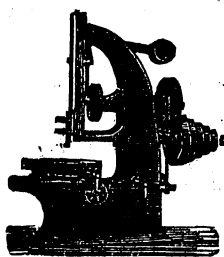
# LATHES.

**ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.**

**Engine Room Chat.** By ROB. GRIMSHAW. This little book presents in colloquial style ideas which appeal to all interested in the generation of power, more particularly those charged with the care of engines and boilers and their appurtenances. 148 pages, cloth. \$1.00

For sale by DAVID WILLIAMS, 96-102 Reade st., N. Y.

**LATHES** PLANERS, SHAPERS, DRILLS, TOOLS.  
Workmanship, Material, &c., Best. Prices Low.  
**SEBASTIAN LATHE CO.,** 118 & 115 Culvert St., CINCINNATI, O.  
MODERN DESIGNS. CAT. FREE.

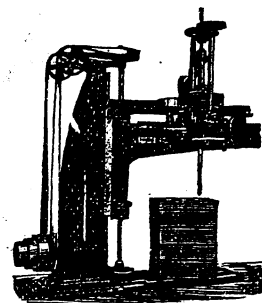


*William Sellers & Co. Incorp.*

PHILADELPHIA, PA.,

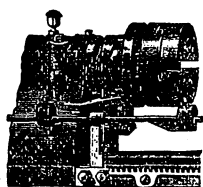
—MANUFACTURERS OF—

Improved Machine Tools for Working Iron and Steel,  
High Speed Power Traveling and Swing Cranes,  
Injectors, Locomotive Turn Tables, Shafting, &c., &c.  
Testing Machines, under patents of A. H. Emery.  
Prices, Descriptive Matter, &c., Furnished on Application.



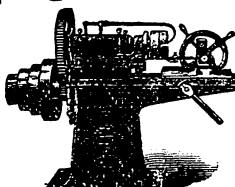
**ADAMS**

**Automatic Bolt-Threading & Nut Tapping Machine.**



Made in all Sizes to Cut from 1-4 in. to 6 in.

The simplest and most durable machine in existence. The threading head is made entirely of steel. No links, levers, springs, caps, cases, blocks or die rings in or about the head. Separate Heads and Dies Furnished. Write for descriptive circular and price-list to



**DETRICK & HARVEY MACHINE CO.,**

Engineers and Machinists,

BALTIMORE, MD.

MANUFACTURERS OF

**THE OPEN SIDE IRON PLANER.**

**MORSE,**

**WILLIAMS**

**& CO.**

Morse Elevator Works.

MANUFACTURERS AND BUILDERS OF

**ELECTRIC, HYDRAULIC, BELT and HAND  
POWER PASSENGER and FREIGHT**

**ELEVATORS.**

1105 Frankford Ave., Philadelphia. 108 Liberty St., New York.  
1116 E. St., N. W., Washington, D. C. 33 Lincoln St., Boston.  
425 Spruce St., Scranton, Pa. 82 Church St., New Haven.  
Omaha Building, Chicago, Ill.

**FAIRMOUNT MACHINE CO.,**

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Sts., Philadelphia, Pa.

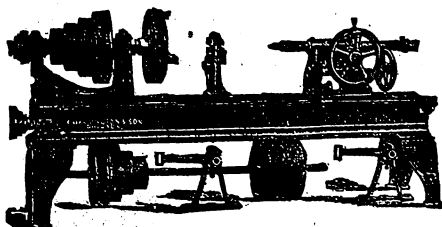
Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

Rope Transmission; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.

**EDWIN HARRINGTON, SON & CO., Incorporated,**

1508 PENNA. AVE., PHILADELPHIA, PA.

—: DESIGNERS AND MANUFACTURERS :—



Improved

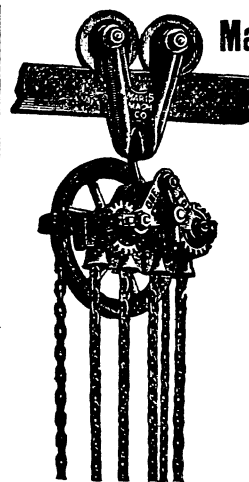
{ SEND  
FOR  
PRICES. }

Lathes,

Drills,

Planers.

Double Chain Hoists.



**Maris & Beekley.**  
PHILA., PA.

MANUFACTURERS OF

**CRANES,**

Power Bridge  
Cranes, Hand  
Bridge Cranes,  
Jib Cranes.

Portable Hoist.  
Holds load at any  
point.

Overhead Track,  
Trolleys,  
Switches.



**SPEIDEL & TROEPER,**  
807 & 809 Cherry Street,  
READING, PA.

Manufacturers of Speidel's Patent  
Economic Safety Hoists,

500 to 30,000 lbs. capacity.

Have been awarded the "John Scott Medal and Premium" by the Franklin Institute of the City of Philadelphia, also Medal and Diploma by the World's Columbian Exposition, at Chicago, for Highest Efficiency, Simplicity and Durability.

With our hoist one man can lift two or three times as fast as with any other hoist. It has two speeds, and is guaranteed to give satisfaction. Traveling and Swing Cranes up to 30,000 lbs. capacity and 60 ft. span. Overhead Tramway, Trolleys, Switches and Special Hoisting Machinery. Self-contained Elevators and Dumb-waiters. Illustrated catalogue and prices on application.

**Moore Mfg. & Fdry. Co.,**

Milwaukee, Wis., U. S. A.,

Manufacturers of

Moore's Anti-Friction

Differential

Chain

Pulley

Block.

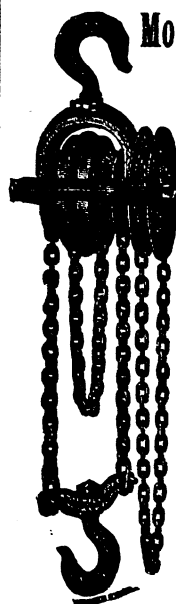
A New Movement!  
A Perpetual Compound Lever!  
Powerful, Simple and Durable!

One Man Can Lift to the Full Capacity of the Block.

Self-Sustaining at Any Point.

The Block Always Hangs Plumb.

Send for descriptive price list mentioning this paper.



# ANNOUNCEMENT.



## DODGE MANUFACTURING CO.

beg to announce the opening of their New York Branch at 43 and 45 Dey St., where an extensive and complete stock of

## POWER TRANSMISSION

## MACHINERY

will be carried. Contracts for complete plants a specialty. A **New Complete Catalogue** will soon be ready for distribution.

Sent to any address upon application.

## DODGE MANUFACTURING COMPANY,

*Works and Main Office, Mishawaka, Ind., U. S. A.*

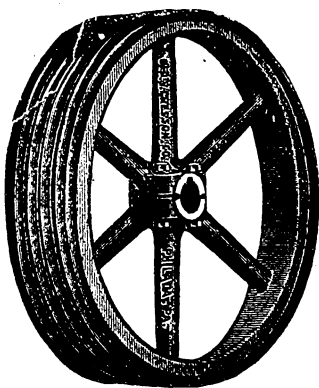
Chicago Branch, 166-174 S. Clinton St.

New York Branch, 43 and 45 Dey St.

Boston Branch, 126 Pearl St. Opened June 1st.

## GEO. V. CRESSON CO.

18th STREET AND ALLEGHENY AVE  
PHILADELPHIA, PA.



## ROPE WHEELS,

All Diameters and Number of Grooves, for Manilla, Hemp, Cotton, or Leather Ropes.



(ESTABLISHED 1854.)

## A. & F. BROWN,

Engineers, Founders and Machinists.

**SHAFTING,  
PULLEYS, HANGERS, ETC.  
FRICTION CLUTCHES.**

Estimates and Plans furnished for transmitting power by  
**HORIZONTAL AND VERTICAL SHAFTING,**  
Also for erecting same.

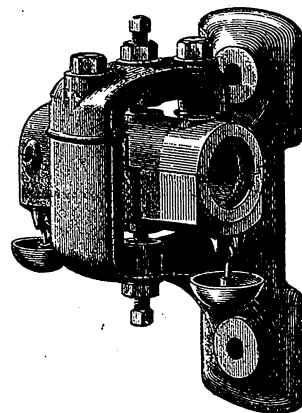
**STEAM SIRENS**

—FOR—

Lighthouse, Steamship, Factory and Fire Signals.

SEND FOR CATALOGUE.

17 DEY ST., - - - NEW YORK.



—THE—

## Sigourney Tool Company, INTERCHANGEABLE MACHINERY

**A SPECIALTY.**

Drill Presses, Automatic Gear Cutters, Typewriters, Book Sewing Machinery, Electrical Goods, Dies, Punches, Drill Jigs, Models and special work of all kinds built by day or contract.

**HARTFORD,**

**CONN.**

# Tanite Mills Emery.

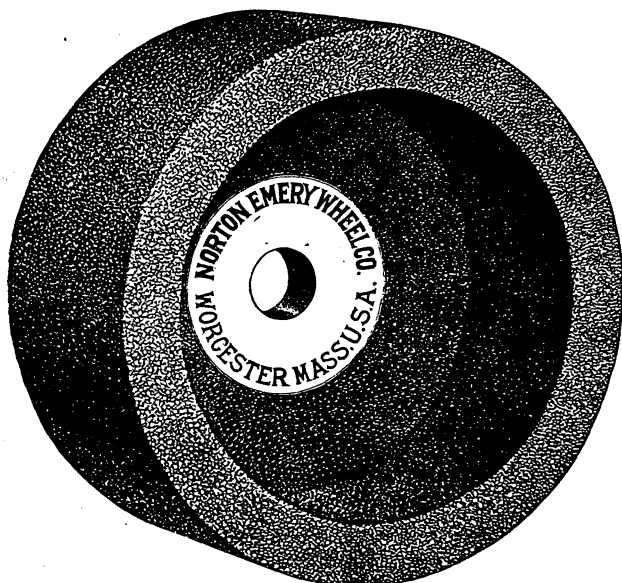
Special inducements suited to our stock and the times.

10 POUND TINS A SPECIALTY.

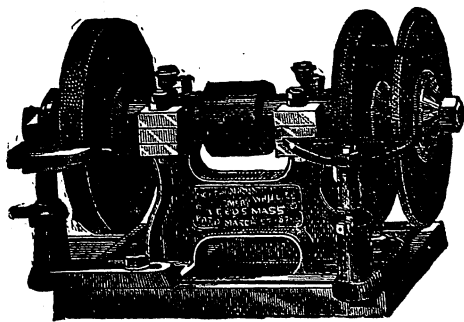
**The TANITE CO.,**

STROUDSBURG, Monroe Co., PA.  
NEW YORK, 181 Washington St.  
CINCINNATI, 1 West Pearl St.

**Norton Emery and Corundum Wheels.**



Illustrated Catalogue Free on Application.



ESTABLISHED 1867. CAPITAL \$100,000

**Northampton Emery Wheel Co.**  
LEEDS, MASS.

And 20 South Canal St., Chicago.

MANUFACTURERS OF

**EMERY WHEELS**

—AND—

**EMERY WHEEL MACHINERY**

Of Best Quality.

Send for Catalogue. FACTORY AT LEEDS, MASS.

**Lathe Tool for Truing Emery Wheels of all Shapes**

The Bennett Tool, with conical cutter, has been in use for years. It is the only tool ever used successfully on any shape of wheels. No modern machinist should be without it. Manufactured by

BAY STATE STAMPING CO., Worcester, Mass.

—PULVERIZE—PULVERIZE—PULVERIZE—

**THE GRIFFIN MILL**

The only perfect Pulverizer of Quartz, Gold or Silver Ores, Portland Cement, Phosphate Rock, Foundry Facings and all other Refractory Substances. Will work wet or dry. Correspondence solicited. Illustrated pamphlet free.

**BRADLEY FERTILIZER CO.,**

92 STATE STREET, BOSTON, MASS.

—PULVERIZE—PULVERIZE—PULVERIZE—

DO NOT BE DECEIVED.

**The Samson**

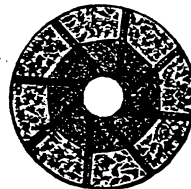
is the best mounted grindstone on the market, and the weight is always as advertised.

Send for Catalogue C.

**The Cleveland Stone Co.**  
CLEVELAND, O.

Patent ROCK EMERY MILL STONES.

Next to  
Diamonds  
in  
Hardness  
and  
Durability.



Made to  
Fit Any  
Mill Frame  
without  
change.

Cuts every substance with unexampled rapidity; always sharp; emery face Never Dressed. As much more Durable than other stones as they are Harder. Never Glaze; grind everything. Most Rapid Grinder known.

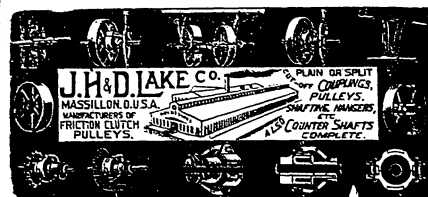
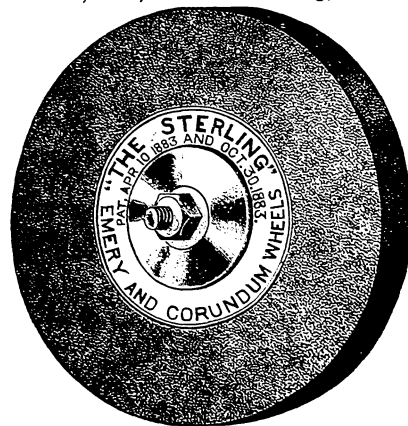
Send for Circular.

STURTEVANT MILL CO., Boston, Mass.

Sterling Emery Wheel Company, 174 Fulton St., N. Y.

FACTORIES:

Tiffin, Ohio, and West Sterling, Mass.



**Hicks' Builders' Guide.**—Comprising an easy, practical system of estimating material and labor for carpenters, contractors and builders. A comprehensive guide to those engaged in the various branches of the building trades. By I. P. Hicks; illustrated by numerous engravings of original drawings. 160 pages; cloth \$1.00  
For Sale by David Williams, 98-102 Rensselaer St., N. Y.

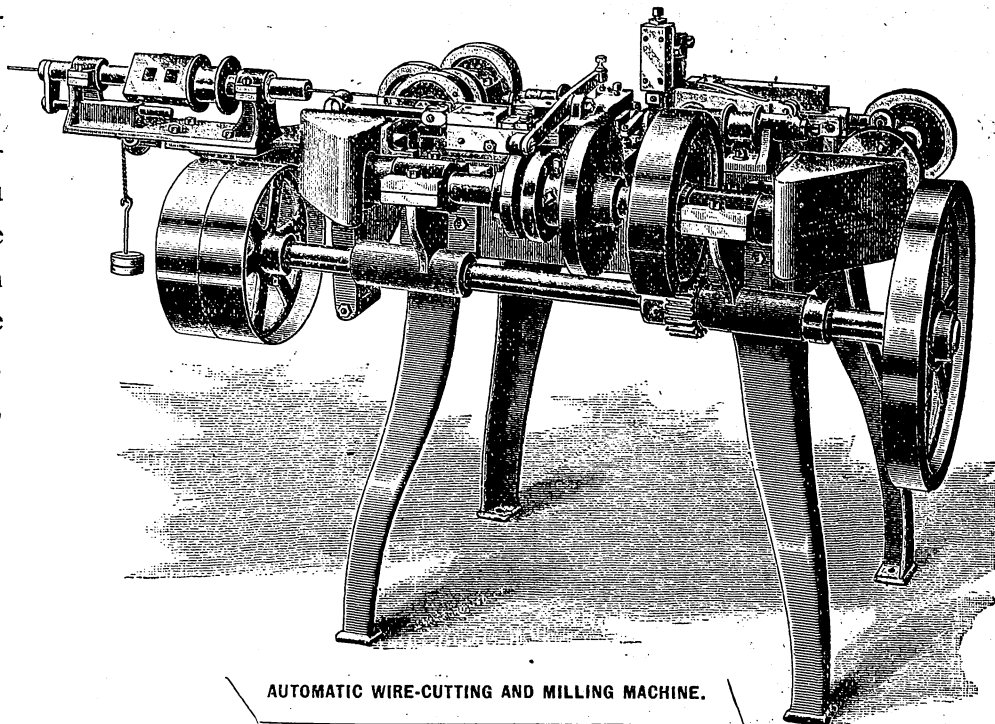
# THE E. J. MANVILLE MACHINE CO.,

MANUFACTURERS,

WATERBURY, CONN.

Is designed to take wire from the coil, and at one operation, straighten, cut, and mill one or both ends round, beveled, or tenoned, for such work as lamp-burner wires and wires for clock work, butts, locks, and various kinds of builders' and other hardware; and it can also be used as a machine for ordinary wire cutting.

In making inquiries, inclose or send a sample of the work you wish to do. In case you send only a sketch of work, always state with accuracy the size, length, and kind of wire, stating the gauge.



AUTOMATIC WIRE-CUTTING AND MILLING MACHINE.

SPECIAL  
AUTOMATIC  
MACHINES.

POWER PRESSES.

WIRE WORKING  
MACHINES.

What Congress Has Done—  
000,000,000.

What We Are Doing—

Furnishing estimates on all classes of machine work. Write us.

*The L. E. Rhodes Co.,*

Hartford, Conn.

## SPECIAL

And Automatic Machinery and Tools for reducing cost of manufacturing machines, parts of machines, articles of hardware, &c., designed and built. Tools, models and experimental work. Estimates given. Correspondence solicited.

IDEAL MACHINE WORKS,  
P. O. Box 655 Hartford, Conn



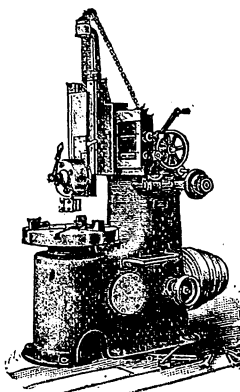
J. Popping's  
Patent Machine  
and Tool Wks.

MANUFACTURERS OF  
Solid Iron Shoulder Rabbet Planes, etc., etc., and  
Hofstatter's Patent Hair Picking Machine.  
N. E. Cor. 58th St. and 11th Ave., N. Y.



The Scattergood  
Time Record and  
Pay Roll Book.  
(Pat. Oct. 13, 1891.)  
Address for Circular to  
HENRY W. SCATTERGOOD,  
23 Richmond St., Phila., Pa.

**E** PATTERN LETTERS **E**  
For Iron and Brass Castings.  
Various Sizes and Styles.  
Heber Wells 157 William St. N.Y.



Lathes,  
Boring and Turning Mills,  
Turret Machines.

BRIDGEPORT MACHINE TOOL WORKS,  
E. P. BULLARD, Prop., Bridgeport, Conn.

NEW YORK OFFICE, 86 LIBERTY ST. and 145 BROADWAY.

Get Your  
**CRUCIBLE : STEEL : CASTINGS**  
AND FINISHED IRON AND STEEL  
**MOTOR GEARS**

FROM  
**THE KING & ANDREWS CO.,**

No. 218 N. Union Street, CHICAGO, ILLS.

We are especially equipped for heavy and light castings, prompt production and shipment, and have unsurpassed facilities for making the best quality of

**SOLID STEEL CASTINGS.**

Send Us Your Patterns and We Will Make the Castings While You Wait.

FOR NUMBERING AND LABELING  
Boxes, Drawers and Shelves  
In Hardware Stores and Factories.

Send for sample and description of our Handy Box of small gummed Letters and Figures, intended for labeling shelf boxes. Put up especially for the Hardware trade.

THE TABLET AND TICKET CO., Mfrs.,  
87-89 Franklin St. Chicago. 89 Franklin St., New York.

**WILLSON'S  
PAPER  
LETTERS**





# BARGAINS.

24 x 48 Miller & Allen Corliss Engine.  
16 x 36 Slide Valve Engine.  
16 x 24 " " " New.  
15 x 30 " " " "  
15 x 18 " " " "  
14 x 30 " " " "  
12 x 20 " " " New.  
14 x 20 Vertical " "

A large number of new and second-hand Boilers, Engines, Lathes, Planers, Shapers, Millers, &c., in stock.

Write us for what you want and we will give you prices and full information.

**LOVEGROVE & CO.,**  
Third and Quarry Sts., Phila., Pa.

We have just published a list of over

## 100 pieces of Machinery

OF DIFFERENT KINDS,  
consisting of Lathes, Planers, etc. If you are in the market for any tools of this nature write us for circular.

**HILL, CLARKE & CO.,**

156 Oliver St., Boston, Mass.  
12 and 14 South Canal St., Chicago, Ill.

### SECOND-HAND MACHINERY.

1 Iron Planer 60 in. x 60 in. x 20 ft., 2 heads on Cross Rail.  
1 Iron Planer 34 in. x 26 in. x 7 ft. 1 30 in. x 30 in. x 8 ft.  
1 Iron Planer 24 in. x 24 in. x 4 ft. 1 32 in. x 25 in. x 6 ft. 6 in.  
1 Iron Planer 16 in. x 12 in. x 3 ft. 1 20 in. x 20 in. x 5 ft.  
1 Engine Lathe 48 in. x 16 ft., raised to 60 in., Putnam make.  
1 Engine Lathe 36 in. x 14 ft., Putnam make.  
1 " 37 in. x 17 ft., D. W. Pond make.  
1 " 26 in. x 10 ft., " "  
1 " 21 in. x 25 ft. 6 in., A1. 1 24 in. x 14 in., New Haven.  
1 Engine Lathe 20 in. x 12 ft., New Haven. 1 18 in. x 3 ft., New Haven.  
1 Drilling Machine 40 in., B. G. S. F. 1 36 in., B. G. S. F., both New Haven.  
1 Drilling Machine 30 in., R. G., Gould.  
1 13 in. Shaping Machine, Gould.  
1 McDougal & Potter 9 in. x 24 in. Steam Hammer.  
1 600 lb. Merritt Drop, Friction.  
1 425 lb. Peck Lift " Geared.  
All kinds of Iron and Wood Working Machinery.  
Lists sent. NEW YORK MACHINERY DEPOT,  
Office 178 Broadway, N. Y.

### Trustee's Sale of Machinery.

Lathe 52 in. swing, raised to 84 in., bed 40 ft. long. Cranes, 15 ton gib, 30 ft. high, and 12 ton, 18 ft. high. Engines 10 x 24 in., 14 x 24 in., 12 x 24 in., 12 x 20 in., all new. Engines 14 x 30 in., 14 x 24 in., 12 x 20 in., 4 x 8 in., refitted. Hundreds of Iron Pulleys and Flywheels. Four steel rim Cuyahoga Friction Pulleys 60 in. diameter, 15 in. face, with clutches. One ditto 72 in. diameter, 20 in. face.

Wm. A. BOLE, Trustee,  
Liberty Ave., cor. 25th St., Pittsburgh, Pa.

**WANTED**  
Job Lots, Special Lots  
**HARDWARE,**  
MANUFACTURED GOODS, Etc.,  
**FOR CASH.**  
**H. H. MANSFIELD, 126 Liberty St., N. Y.**

**WANTED.**  
To furnish reasonable estimates on specialties in light metal work.  
**CLARK & COWLES, Plainville, Conn.**  
Manufacturers of Clock Trimmings, Rivets, Springs &c.

## SOME GOOD THINGS.

2 9 in. x 15 in. Blake Crushers.  
1 8 in. x 20 in. Comly Crusher.  
1 Hilles & Jones Angle Shear.  
1 10 in. Heavy Alligator Shear.  
1 Heavy Combined Punch and Shear.  
1 Medium Combined Punch and Shear.  
1 Ferris & Miles Steam Drop Hammer.  
1 5 in. Hurlburt & Rogers Cut-off Machine.  
4 No. 6 Cameron Steam Pumps.  
1 8 in. x 5 in. x 10 in. Delamater Duplex pump.  
1 10 in. x 5 in. x 12 in. Niagara Brass Pump.  
1 10 in. x 6 in. x 12 in. Dean Pump.  
1 14 in. x 12 in. x 18 in. Blake Pump.  
Send for catalogue.

**THOS. P. CONARD,**  
206 Walnut Place, Philadelphia.

## FOR SALE. Worthington Mine Pump

LEHIGH PATTERN.  
20 in. High Pressure.  
40 in. Low " "  
9 1-2 in. Plungers.  
36 in. Stroke.

IN FIRST CLASS ORDER and READY  
for IMMEDIATE SHIPMENT. Address

"A," No. 621,  
office of The Iron Age, 96-102 Reade St., N. Y.

Two 125 H.-P. Phoenix Automatic Compound Engines.  
One 80 H.-P. Beck Automatic Engine.  
One 60 and one 10 H. P. Westinghouse Automatic Engine.  
10, 20, 30, 40 and 50 H.-P. Automatic Engines.  
100, 200, 500 and 500 H.-P. Berryman Feed Water Heaters.  
All the above in first-class condition and cheap.  
**FRANK TOOMEY,**  
131 N. Third St., Philadelphia, Pa.

## Second-hand T Rails — FOR — BUILDERS' USE AND RELAYING FOR SALE.

Second-hand Steel and Iron T Rails of all sizes. Sound and selected and cut to specified lengths promptly for builders' use, vaults, kilns, foundations &c. at low prices and quick delivery. All sizes of selected relaying T and Girder rails ready for shipment at bottom figures. Apply

**JOSEPH JEWKES, Steel Rails,**  
Pittsburgh, Pa.

## AT ALL TIMES

we have on hand Steam Pumps, Second-hand and New. Every Second-hand pump is tested and guaranteed before leaving shop. Write us for information, also for catalogue, circulars, prices, etc., of the celebrated "Hooker Patent Steam Pump," which we manufacture.

**HOOVER-COLVILLE STEAM PUMP CO.,**  
St. Louis, Mo.

**SOME BARGAINS HERE.**  
1 Hendey Shaper, 16 in. stroke, imp. vise.  
1 14 x 6 Screw Cutting Engine Lathe. New.  
Pattern Makers' Speed Lathe. 7 ft. Bed, \$40. New.  
2 1/2 Hendey Cutting-off Machine. New.  
44 in. C. & D. Resaw. Fine condition.  
Radial Drill, 5 1/2 ft. arm.  
Axe Cutting-off Machine, Double Head, cut 9/16 dia.  
Quantity 2d hand Dodge Pulleys. Cheap.  
Safety Construction Company's combined Trap and Pump.  
And other machinery, new and second hand. Write for prices. **Machinery Supply Company,**  
89, 41 and 43 Central Ave., Rochester, N. Y.

## FOR SALE.

22 ton 36 in. gauge Locomotive.  
Several Corliss Engines.  
Several Automatic Engines.  
Variety of Slide Valve Engines.  
42 in. Niles Boring and Drilling Machine.  
No. 2 Brainerd Universal Milling Machine.  
No. 1 Davis Keyseater with cutters.  
Pair 8 in. 8 ft. Bending Rolls.  
500 light T. & H. Dynamo, Incandescent.  
100 " Edison " " "  
30 " Jenney " " "  
5 " U. S. " " "  
**JAS. T. MACKAY,**  
412 So. 6th St., St. Louis.

## SECOND-HAND MACHINE TOOLS.

**ENGINE LATHES.**  
1 12 in. x 5 ft. Geo. Gage.  
1 14 in. x 6 ft. Bogart.  
1 15 in. x 6 ft. Fitchburg.  
1 16 in. x 6 ft. Perkins.  
1 16 in. x 7 ft. Bement.  
1 16 in. x 6 ft. F. E. Reed.  
1 18 in. x 6 ft. New Haven.  
1 18 in. x 8 ft. Pease.  
1 20 in. x 6 ft. Bullard.  
1 29 in. x 12 ft. Kield.  
1 37 in. x 14 ft. Old Style.

**HAND LATHES.**  
4 10 in. x 41 in. Garvin.  
1 11 in. x 4 ft. F. E. Reed.  
1 11 in. x 4 ft. Standard.  
1 12 in. x 5 ft. Back Geared.  
2 20 in. x 0 ft. Back Geared.

**MISCELLANEOUS.**  
1 6 in. Bement Slotter.  
1 42 in. Gould & E. Automatic Gear Cutter.  
2 10 in. x 5 ft. Gage Square Arbor Fox Lathes.  
1 5 in. Cutting-off Machine.  
1 3 in. Armstrong Pipe Machine.  
1 No. 2 Springfield Tool Grinder.  
1 No. 4 Springfield Tool Grinder.  
1 30 in. Squaring Shear.  
1 No. 2 Pratt & W. Die Sinker.  
1 No. 3 Garvin Cutter and Tool Grinder.  
1 No. 2 Garvin Cutter and Drill Grinder.  
1 No. 1 Slate Marking Machine.  
1 No. 1 Brown & Sharpe Surface Grinder.  
1 2 in. Bignall & Keeler Pipe Machine.

**PLANERS.**  
1 16 in. x 16 in. x 3 ft. Bel-den Machine Co.  
1 22 in. x 22 in. x 4 ft. L. W. Pond.  
1 24 in. x 24 in. x 6 ft. Novelty Iron Works.  
1 24 in. x 24 in. x 10 ft. Pease Planer Co.  
1 28 in. x 28 in. x 7 ft. New Haven.

**SHAPERS.**  
1 6 in. Boynton & Plummer.  
2 10 in. Juengst Crank.  
2 10 in. Wood & Light, Traverse Head.  
1 5 in. Juengst Friction.  
1 18 in. Putnam, Traverse Head.

Also a large number of other machines. Write for complete list and detailed description.

**THE GARVIN MACHINE CO.,**  
Laight & Canal Sts., New York.  
Also 61 North 7th St., Philadelphia, Pa.

## CORLISS And Other Automatic Slide Valve Engines, Etc.

Corliss.	High Speed Auto.	Horizontal Slide Valve.	Vertical Slide Valve.
10 x 20	11 x 20	9 x 24	20 x 24
10 x 24	10 x 24	10 x 12	13 x 16
16 x 42	13 x 12	10 x 24	10 x 12
23 x 36	Horizontal Slide Valve.	11 x 20	9 x 10
28 x 48	23 x 36	12 x 18	9 x 9
30 x 60	16 x 36	12 x 24	7 x 7
30 x 72	15 x 24	14 x 24	5 x 5

**HORIZONTAL BOILERS,** 3, 6 x 16; 8, 6 1/2 x 16; 5, 5 x 16; 3, 5 x 18; 1, 4 1/2 x 12, and several others.  
**LOCOMOTIVE BOILERS,** 30, 45, 60, 100 and 160 H.-P.  
One 1000 gal. Duplex Fire Pump, Brennan Crusher, Bogardus Mill, Burr Mill, Fan Blower, Platform Scales etc., etc. Send for catalogue.

**G. M. CLAPP, 74 Cortlandt St., New York.**

**!!! FOR SALE. !!!**  
**BAKER BLOWERS,** Nos. 3, 4, 5, 5 1/2, 7 and 7 1/2.  
**ROOT BLOWERS,** Nos. 1, 2, 3, 5, 6 and 7.  
**CAMERON VACUUM PUMP,** 16 in. x 20 in. x 24 in.  
**KNOWLES PUMP,** 14 in. x 10 in. x 12 in.  
**NIAGARA PUMP,** 9 in. x 5 in. x 10 in.  
**1 No. 9 CLAYTON DUPLEX AIR COMPRESSOR,** 22 in. x 24 in. x 30 in.  
**Horizontal Boilers,** 18 ft. x 6 ft., 7 ft. x 3 ft. Fixtures.  
**Locomotive boilers,** 20, 40 and 100 H. P.  
Machinery Buyers write to  
**C. R. BIGELOW, Machinery Expert,**  
45 Dey St., New York City.

## FOR SALE. SECOND-HAND.

**ENGINES,** Horizontal and Vertical. All types and sizes up to 2000 H.-P.  
**BOILERS,** Vertical and Horizontal, and 3 Batteries of "Heine" water tube.  
**MILLS,** 3 high, 12 in., 20 in., 22 in., and 36 in.  
1 Reversing 32 in. Blooming Mill complete.  
**STEAM HAMMERS.** Various sizes up to 10 ton.  
**SHEARS** for Bars, Rails, Blooms and Plates.  
**SQUEEZERS, ROLL LATHES, CRANES, GRINDING PANS, MACHINE SHOP TOOLS, &c.**

**LOCOMOTIVES.** Fine condition, various sizes and gauges.

"If you don't see what you want, ask for it" of

**B. M. EVERSON,**

301 Smithfield St., Pittsburgh, Pa.

**ALUMINUM GOODS** and small **CASTINGS** in quantity to order. No goods for sale. All kinds of novelties made. If you are after information, enclose stamp. **THE H. H. FRANKLIN MFG. CO.,**  
Syracuse, N. Y.

**FOR SALE.**  
The Star and Crescent Furnace, capacity 50 tons per day, with all the Buildings, Ore Lands, Tramways and Equipments. The whole of it new and in good running order. Plenty of ore, cheap charcoal, plenty of labor and plenty of water. Pig iron can be made cheaper than in any other part of the Union. This furnace is located on a railroad line and is situated in Cherokee County, Texas, near New Birmingham. **LEON F. HAUBTMAN, Room 9, Godchaux Building, New Orleans, La.**

**FOR SALE.**  
Cheap. Large Sturtevant Hot Blast Apparatus. Eleven thousand feet pipe. Twelve foot Fan. Almost new. Address **HUYETT & SMITH MFG. CO., Detroit, Mich.**

**SECOND-HAND MACHINERY.****ENGINE LATHES.**

- 2 11 in. x 5 ft. Raise and Fall Rest. Reed & Prentice. A1 order.
- 1 15 in. x 4 ft. Plain Gib. Reed. A1 order.
- 6 16 in. x 6 ft. R. & F. and Plain Gib Carriage. Young, Blaisdell and Plather. A1 order.
- 1 17 in. x 8 ft. Comp. Rest. P. C. Feed. Fifeid. A1 order.
- 2 18 in. x 8 ft. Comp. Rest. P. C. Feed. Fifeid and Dustin. A1 order.
- 1 19 in. x 6 ft. Comp. Rest. P. C. Feed. Fifeid. A1 order.
- 3 20 in. x 8 ft. x 8 ft. Plain and Comp. Rest. Bullard. A1 order.
- 1 24 in. x 25 ft. Plain Rest. Lath & Morse. A1 order.
- 1 36 in. x 18 ft. Comp. Rest. Bement, Colby & M. Fair order.
- 1 32 in. x 16 ft. Comp. Rest. Perkins. Practically new.

**DRILLS. SINGLE SPINDLE.**

- 2 20 in. Wheel and Lever Drill. Prentice & Davis. Good order.
- 20 in. Geared Drill. Very heavy. Good order.
- 1 20 in. x 38 in. Gap Wheel Feed Drill. Wood & Laight. Fair order.

**GANG DRILLS.**

- 3 Sensitive Drills. Slate. 1, 2 and 3 spindle. A1 order.

ALSO LARGE STOCK NEW TOOLS.

**THE NILES TOOL WORKS CO.,**  
Eastern Branch, 136, 138 Liberty St., N. Y. City

**RAILS FOR SALE.**

**NEW AND SECOND-HAND**  
Relaying rails of all sections. Second-hand cut rails for **Builders Use.** Also a small second-hand Engine and Boiler for sale.

**J. H. RICHARDSON & CO.,**  
Pittsburgh, Pa.

**SPECIAL.**

We have several machines which we must sell immediately to turn into money at sacrifice prices.

- 1 "Peck" Drop Hammer and Lifter, 200 lb. drop.
- 1 Trip Hammer, 25 lb. blow.
- 1 Universal Milling Machine.
- 1 Polishing Tumbling Barrel.
- 2 Vertical Tubular 35 H. P. Boilers.

**G. W. SCHULTZ & CO.,**  
308 Walnut St., PHILADELPHIA.

**FOR SALE.**

- 1 Corliss Engine, nearly new; 250 H. P.
- 20 in. x 36 in. Wright Automatic Engine.
- 3 60 H. P. Armstrong & Sims Engines.
- 1 Blake Crusher and 2 Elevator Engines.

WILSON &amp; ROAKE,

Front and Dover Streets, New York City.

**FOR SALE.**

Complete Wood Pulley Plant, including ground, buildings engine and boiler, machinery, &c., &c. 110 miles from Chicago. Good location for any business. Best railroad facilities. Will sell together or separately at a sacrifice. Address

**J. DAWSON,**  
57 South Canal St., Chicago.

**Second-hand Machinery For Sale.**

- 2 36 in. x 11 ft. Horizontal Stationary Boilers.
- 1 12 H. P. Upright Engine (Greenfield).
- 1 18 H. P. Upright Boiler.
- 1 15 H. P. Horizontal Engine.
- 1 14 to 14 in. Open Die Bolt Cutter.
- 1 24 in. x 25 ft. Engine Lath.
- 2 No. 2 Roots' Blowers.

Also other machinery at low prices.

**COOKE & CO.,**  
163 and 165 Washington St., New York.

**For Sale, Very Low for Cash.**

500 tons Relaying Steel Street Rails, side bearing, 35 to 47 lb. sections. Also 3 tanks 7½ ft. diameter and 10 ft. long.

**WM. H. PERRY & CO.,** Providence, R. I.

**BIG BARGAINS.****Second-hand Machinery****For Car Shops.**

- 1 36 in. 150 ton Hydraulic Wheel Press.
- 1 Bement, Miles & Co. Single Axle Lath.
- 1 36 in. Bement, Miles & Co. Car Wheel Borer with Hand Crane.
- 1 No. 6 J. A. Fay & Co. Car Mortiser and Borer.
- 1 J. A. Fay & Co. Car Tenoning Machine.
- 1 J. A. Fay & Co. No. 2½ Pacific Planer and Matcher.
- 1 J. A. Fay & Co. Universal Horizontal Car Borer.
- 1 J. A. Fay & Co. No. 4 Tenoning Machine.
- 1 Lane & Bodley Large Car Mortiser and Borer.
- 1 1 inch Double National Bolt Cutter.
- 1 J. A. Fay & Co. Vertical 3-Spindle Car Borer.

Write for full list of new and second-hand Wood and Iron Working Machinery.

**U. Baird Machinery Co.,**  
Pittsburg Pa.

**FOR SALE.**

The following second-hand tools in good order:

- 12 x 4 Lath. P. & W.
- 34 x 6¼ Lath. Putnam Machine Co.
- 50 in. double head Driving Wheel Lath.
- 33 in. Chucking machine. P. & W.
- Milling Machine, double column, double head. P. & W. Grant Pattern.
- 36 x 36 x 10 Sellers Planer.
- Two 3 Spindle Drills, P. & W.
- BRIDGEPORT MACHINE TOOL WORKS.**  
E. P. BULLARD, Prop., Bridgeport, Conn.  
N. Y. Office, 145 Broadway and 86 Liberty St.

**EXECUTOR'S SALE**

of Hardware, Plumbing and Metal Working business to close estate of late James G. Burt. Business established twenty years. Stock and fixtures \$20,000 to \$25,000. A rare opportunity for investment in paying business in "Sunny California." Address

**D. A. MOULTON, Executor,**  
San Bernardino, Cal.

**AGENCY WANTED.**

Two mechanical engineers of ripe experience and business capacity are contemplating opening an engineering office and manufacturers' agency in Chicago and would like to represent some manufacturers of machinery, and supplies in connection with their business. Address

"ENGINEERS,"

office of *The Iron Age*, 59 Dearborn St., Chicago.**FOR SALE.**

A new iron building for immediate shipment, 61 ft. wide, 200 ft. long, consisting of a main span 61 ft. wide, with lean-to on one side 20 ft. wide. The trusses are sufficiently strong to carry a line of shafting and light jib crane. This building is suitable for a Machine Shop, Tin Plate Mill, Rolling Mill, etc. For further information address

**SHIFFLER BRIDGE CO.,**  
Pittsburg, Pa.

**FOR SALE.**

**CRANK and GEARED SHAPERS.**

Write us for Bargains.

**J. STEPTOE & CO.,** Cincinnati, O.

**WANTED.**

Catalogues, Prices and Discounts

for all kinds of

**MACHINERY**

used for manufacturing all sizes and kinds of carriage and wagon axles. New and second-hand.

ADDRESS

**HENRY H. PORTER,**  
Dowagiac, Mich.

**LODGE AND****DAVIS**

Machine Tool Co., Cincinnati, O., U. S. A.,

Have for sale a large line of first-class second hand Engine Lathes, Planers, Shapers, Drill Presses, Milling Machines, &c.

WRITE FOR LIST AND PRICES.

**PITTSBURGH SALES AGENCY,**

**J. H. HILLMAN, Manager,**

**No. 8 Wood St.,**  
**Pittsburgh, Pa.,**

Offers for sale at very low prices **BESSEMER STEEL WORKS** and **STRUCTURAL STEEL MILLS**, also **STEEL MILL** for Rolling Bars and cold rolling, two **BLAST FURNACES**, a **RUSTLESS IRON WORKS**, interest in **TIN MILL** in **INDIANA**, **TUBE WORKS** and numerous other manufacturing interests and large quantity of very desirable **COAL PROPERTIES**, improved and unimproved.

**Dealers in Coal and Iron Lands.**

Examinations and Reports

on Properties.

References on Application.

**A Bargain.****A FINE****Business Opportunity**

for a live business man or two partners who have \$25,000 to invest in a first-class, old, well established and well located

**JOBING and RETAIL HARDWARE**

business, which did not lose money last year.

STOCK IS WELL ASSORTED.

Good location in large Eastern City. Reasonable lease of premises can be continued. This will bear full investigation. Parties who can command above amount of capital address

"BARGAIN," Box 315,  
office of *The Iron Age*, 96-102 Reade St., N. Y.

**FOR SALE OR RENT.**

A Scrap Yard and Buildings containing Boiler, Engine and Shears for cutting Scrap. Also a Cupola and Blower with floor room for making castings. Address

"SCRAP,"

office of *The Iron Age*, 220 So. 4th St., Philadelphia, Pa.

**J. A. COLEMAN,**  
Author Coleman's Mechanic's Liens in Illinois,  
Attorney at Law,  
82 Hartford Building, Chicago.  
**MECHANIC'S LIENS EXCLUSIVELY.**

## From the World's Fair Buildings.

### SECOND-HAND

**I Beams,  
Channels,  
Z Bars,  
Angles**

**Trusses,  
Girders,**

**Bolts, Nuts, Rivets &c.,**

Also about 275,000 ft. second-hand Lumber, Timber, Joist, Flooring, &c. For particulars, prices, &c., address

**G. H. SIBELL & CO.,**  
218 La Salle St., Chicago.

### Mill and Factory Property at Auction.

It is often advisable or necessary to sell Mill and Factory Property at Public Auction. We take entire charge of Auction Sales of Manufacturing Property, both Real Estate and plant, in all parts of the country. For OWNERS, RECEIVERS, ASSIGNEES and ADMINISTRATORS. Particulars on application.

**E. DE FOREST SHELTON & CO.,**  
SPECIALISTS MANUFACTURING PROPERTY,  
Stewart Building, 280 Broadway, New York City.  
Mill and Factory Property Negotiated.

## FOR SALE.

### STOCK OF HARDWARE

of about \$2500 in a good live town in Northern Indiana. Stock will be sold at a bargain. Address

**THE GEO. WORTHINGTON CO.,**  
Cleveland, Ohio.

## FOR SALE CHEAP.

A lot of Rolling Mill Machinery, Engines, 30-inch Plate Trains, Shears, Testing Machines, Cranes, Pumps, Electric Light Machines, Turbines, Blower, etc., etc. Full particulars by applying to

**MATTHEW GILL, Jr.,**  
308 Walnut St., Phila., Pa.

## FOR SALE.

Good stock of Hardware and Lumber in good live town in Northern Illinois. Will invoice from \$6000 to \$7000. Good established trade of from \$15,000 to \$18,000 per year. For sale for cash only. This is a rare chance to go into business. Address

**LOCK BOX 2,**  
Cabery, Ill.

## HARDWARE AGENCY WANTED.

by a young man of experience in this line and well acquainted with the trade, for the sale of Hardware Specialties on commission in Boston and vicinity. Address "F.," office of *The Iron Age*, 146 Franklin St., Boston, Mass.

**AN OLD ESTABLISHED** hardware house in New York, whose salesmen cover the entire United States, wants the sole agency of American manufacturers of Chains, Toilet Clippers, Locks, Files, Carpenters' Tools and similar articles. Address

"W. B. G.," No. 105,  
office of *The Iron Age*, 96-102 Reade St., New York.

### FOR SALE.

**Hot Pressed Square Nuts.**

20 Kegs 7-8 x 3-8 x 7-10.

8 Kegs 31-32 x 9-16 x 29-34.

**B. H. Track Bolts Hex. Nuts.**

75 Kegs 5-8 x 2-3-4.

All recently made and in good condition. Will sell all or any portion cheap. Address

"NUTS," No. 621,  
office of *The Iron Age*, 96-102 Reade St., New York.

## FOR SALE.

Good stock of Hardware and Harness in good live town. No better land in the State for farming. Will invoice from \$3000 to \$4000. For sale for cash.

**I. N. HART,**  
St. Joseph, Ill.

## FOR SALE.

Two patents with professional opinion on Sectional Steam Boilers, as well as patent on process and apparatus for shaping metals into shapes by electricity that heretofore could only be cast, thus enabling one to make the zigzag headers for sectional steam boilers of wrought iron or sheet steel in one piece and making the boilers adaptable for marine purposes. Address

**G. ENGEL,**  
Hotel Washington, Jersey City, N. J.

**FOR SALE OR TO LEASE** on good terms, a manufacturing water power plant. Stone buildings, 1300 horse power, fully equipped with turbines, suitable for a wood pulp mill, electrolytic refining works or metal rolling mill. Advantageously situated. Address "WATER POWER," office of *The Iron Age*, 96-102 Reade St., New York

## 100 CITIES AND TOWNS WANTING INDUSTRIES

Is the title of a pamphlet issued by the Illinois Central R. Co. If you are thinking of making a change in location and are not well informed as to the advantages of locating either in the West or South, write for a copy. If you want in a nutshell the

## SALIENT POINTS OF OVER 100 PLACES

on the line of the Illinois Central and Yazoo & Mississippi Valley Railroads, giving the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries desired, etc., apply to the undersigned. Our line is in the shape of the figure "7" and runs from Sioux Falls, S. D., and Sioux City, Ia., to New Orleans, passing through South Dakota, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Kentucky, Tennessee, Mississippi and Louisiana, and has

## NEARLY EVERY KIND OF RAW MATERIAL

used in manufacturing, together with populous sections which are large consumers of the manufactured product. To sound industries which will bear investigation, substantial inducements will be given by many of our places, and they will be welcomed heartily by the different sections traversed by the Illinois Central and Yazoo & Mississippi Valley Railroads. For all information on the subject, address

**GEO. C. POWER,**

Industrial Commissioner I. C. R. R., Central Station, Chicago, Ill.

### WANTED TO BUY.

One second-hand Engine Lathe to swing from 35 in. to 38 in. and from 9 to 12 ft. between centres, also one second-hand Drill Press to swing from 4 to 6 ft., also one second-hand Cylinder Boring Machine about 3 1/2 in. diameter to bore from about 9 to 24 in. diameter cylinders and about 32 in. long. **JOHN F. RILEY,** 6 and 8 South St., Charleston, S. C.

## WANTED.

### 4000 TONS RAILS.

Any railroad having 55 or 60 lb. rails in lots from 500 tons up and suitable for relaying will please send full information to

"CONSUMER,"

office of *The Iron Age*, 96-102 Reade St., New York City.

## FOR SALE. HARDWARE STOCK.

A nice clean stock that will invoice about \$4000. Located in a county seat town in Central Iowa of 2500 inhabitants. Good schools and churches, fine farm land, well established trade. Good reasons for selling, which will be explained on application. Will sell cheap for cash only. Address "CENTRAL IOWA," office of *The Iron Age*, 96-102 Reade St., New York.

## FOR SALE.

A good stock of Hardware, Paints and Oils in one of the best growing towns in New England. Will invoice about \$15,000. It will pay you to give this your earliest attention. Good reasons for selling. Address

"GROWING TOWN,"

office of *The Iron Age*, 96-102 Reade St., N. Y.

**GREAT BUSINESS OPENING** for a few persons with means to secure exclusive territory for the sale of the wonderful **METAL JOINT WOOD FASTENER.** For particulars address at once

**E. M. YOUNKEN,**

Burnsville, W. Va.

## FOR SALE.

Electric Light Plant, nearly new. Cost \$5000. Will sell cheap.

1 600 Light Incandescent Dynamo.

1 20 " Arc Dynamo.

1 11 in. x 12 in. Westinghouse Standard Engine. Address

"V. Z.," Lock Box 1086,  
Philadelphia.

## For Sale or Lease.

### TO CLOSE AN ESTATE.

**Bloomfield, NEW JERSEY.**

Brass Rolling Mill and Factory Buildings. Fully equipped and in good condition. Price low. Payments easy. Apply on the premises or to

**JOHN M. GWINNELL,**  
Newark, N. J.

Care of Estate of P. Hayden.

### WANTED.

### FEED WATER HEATER.

200 H. P. Good condition. Address

"HEATER,"  
Lebanon, Pa.

## MAP OF THE UNITED STATES.

A large handsome map of the United States mounted and suitable for office or home use, is issued by the Burlington Route. Copies will be mailed to any address (mentioning *The Iron Age*) on receipt of fifteen cents in postage by P. S. EUSTIS, Gen'l Pass. Agent, C. B. & Q. R. R., Chicago, Ill.

## Collections!

**ATTENTION!** Merchants and Manufacturers.—We collect your past due accounts. Do not let them remain too long upon your books. Send for our draft book.

**THE HARDWARE BOARD OF TRADE, Ltd.**  
4 and 6 Warren street, New York.  
**JAS. H. GOLDEY, Treas.**

**EUGENE BISSELL, Auctioneer.**

**E. BISSELL, SON & CO.,**

Successors to

**HAYDOCK & BISSELL,**  
WHOLESALE

### HARDWARE AUCTIONEERS,

19 Murray St. and 15 Park Place, N. Y.  
Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

## HARDWARE AND IRON AGENCIES WANTED.

**R. A. BAINES,** Manufacturers' Agent,  
Toronto, Canada.

## CATALOGUES AND QUOTATIONS

Filed and Found without effort by our system. Simple and not expensive.

Every Buyer needs it. Every User praises it.

We also make Paper Boxes and Cartons of all kinds. We make Gummed Labels for marking Merchandise, Boxes and Drawers. Write for Circulars and Prices.

**The Folding Paper Box Co.,**  
SOUTH BEND, INDIANA

**ADOLPH BUTZE,**

Manufacturers' Agent.

Railroad, Packing House and Contractors' Supplies.

AGENT FOR—

**LATROBE STEEL WORKS,** Locomotive and Car Wheel Tires. **UNITED RUBBER CO.,** Hose, Packing, &c. **GEO. GRIFFITHS CO.,** Shovels, Scoops, &c.

**Corrugated Galvanized and Sheet Iron,** Plate, Tank and Bar Iron, Waste—White, Colored and Wool.

Bank of Commerce Bldg. St. Louis, Mo.

**NOW is the time to INVEST in  
SOUTHERN TIMBER-  
MINERAL LANDS,**

Before prices advance. All kinds of mines for sale.

**E. C. ROBERTSON,**

Terms Easy. CINCINNATI, O. Titles Perfect

**HELP WANTED.**

*Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.*

**A FIRST CLASS Charcoal Burner.** Address, stating wages, **PICTOU CHARCOAL IRON Co.,** Bridgeville, Nova Scotia.

**A N EXCEPTIONAL OPPORTUNITY** is open to an experienced business man of high character and ability to take charge of the commercial development of an important improvement in steam boilers; one residing in New York City or vicinity preferred. Address, stating fully business experience, "M. A. M. Soc. M. E.," office of *The Iron Age*, 96-102 Reade St., New York City.

**A CHARCOAL furnace manager** of experience; applications must be accompanied by full information, age, previous experience, salary expected and references, and will be considered confidential. Address "CHARCOAL," No. 621, office of *The Iron Age*, 96-102 Reade St., New York.

**FIRST-CLASS FOREMAN** to take charge of blacksmithing department in agricultural implement manufactory. **B. F. AVERY & SONS,** Louisville, Ky.

**TRAVELING MEN** wanted by an old established cutlery concern for the Middle, Western and Southern States, on a commission or part profit basis, to sell the retail trade. Apply with references to **J. N. E. McWILLIAMS,** 110 Wabash Ave., Chicago.

**A MAN** who thoroughly understands the making of sheet iron; must be capable and competent to erect and take charge of a mill; no man but one who is thoroughly familiar with the business in all its details need apply. Address "SHEET IRON," No. 614, office of *The Iron Age*, 96-102 Reade St., New York.

**SITUATIONS WANTED.**

*Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.*

**A MERICAN;** age 29; married; has served leading manufacturers as bookkeeper, correspondent, managing clerk, cost clerk, &c.; disengaged June 15. Address "AMERICAN," Box 621, office of *The Iron Age*, 96-102 Reade St., New York.

**EXPERIENCED** hardwareman and traveler wishes to represent on the road manufacturer of hardware or cutlery or hardware commission house in territory west of Pittsburgh or south of Cincinnati; can furnish first-class references. Address "F. P. S.," No. 621, office of *The Iron Age*, 96-102 Reade St., N. Y.

**BRICKLAYER** wants position in rolling mill; is well posted on furnace building and all brick work pertaining to steel works; can give good references. Address "BRICKLAYER," office of *The Iron Age*, 509-510 Hamilton Building, Pittsburgh, Pa.

**SIX YEARS** of business, office and shop experience in the iron business; first-class double entry bookkeeper and experienced in handling men. Address "OFFICE AND SHOP," office of *The Iron Age*, 96-102 Reade St., N. Y.

**A S FOREMAN** in an iron foundry, by a practical molder used to green and dry sand molding; can give good references. "MOLDER," No. 614, office of *The Iron Age*, 96-102 Reade St., New York.

**A YOUNG MAN** (age 19) desires a position under a competent engineer in New York City or in New Jersey, to learn mechanical drawing; has had some school training in that branch; salary not an object. Address "DRAWING," No. 614, office of *The Iron Age*, 96-102 Reade St., New York.

**A S SUPERINTENDENT** of file works, by a practical man thoroughly posted in all details and improvements in machinery used in the manufacture of files, having had 12 years' experience with the largest and most successful file manufacturers in the world. Address "SUPERINTENDENT," office of *The Iron Age*, 220 So. 4th St. Philadelphia, Pa.

**A N EXPERIENCED TRAVELER,** well acquainted with the general and carriage hardware trade, now traveling for one manufacturer East and West, would like to add another, to share expenses. Address "TRAVELER," office of *The Iron Age*, 96-102 Reade St., New York.

**A N EXPERIENCED ACCOUNTANT,** late cashier and bookkeeper for a large iron and steel manufacturing company in East Pennsylvania, desires suitable position in an established tin plate business with privilege of investment if mutually satisfactory. "CASHIER," No. 614, office of *The Iron Age*, 96-102 Reade St., New York.

**A S SUPERINTENDENT** of machinery and repairs, or local Superintendent or Manager of manufacturing establishment; fully qualified by previous experience; now employed; references. **HENRY W. SCHOFIELD,** 22 South St., New York City.

**SELLING AGENCY WANTED,** for blast furnace and iron and steel works products, by a gentleman having extensive acquaintance among railroads, foundries and shops. Address "AGENT," No. 111, office of *The Iron Age*, 96-102 Reade St., New York.

**HAVING HAD A PRACTICAL** experience for over 20 years in manufacturing light hardware and specialties, well acquainted with the running of the following departments, iron and brass foundries, metal pattern and tool making, polishing, plating, drilling, milling, japanning and estimating and making costs, etc., and having had charge of all these different departments, I would like to communicate with some house who wish a man of my experience either to take charge of the mechanical part or to take a good sized contract. Address "LIGHT HARDWARE," No. 67, office of *The Iron Age*, 96-102 Reade St., New York.

**A PRACTICAL GUIDE ROLLER** of ten years' experience; can furnish A1 reference. Address "GUIDE ROLLER," Box 614, office of *The Iron Age*, 96-102 Reade St., New York.

**Boxes Made Absolutely Secure**  
BY USING THE PORTABLE  
**BOX BANDER**

ONE MAN CAN BAND  
YOUR BOXES QUICKER THAN TWO  
MEN CAN IN ANY OTHER WAY.  
HOOP IRON WIRE OR ANY OTHER FLEXIBLE MATERIAL CAN BE USED EQUALLY WELL. Send for price  
SOON PAYS FOR ITSELF J. W. GOODSELL • BURLINGTON, VT.

If advertising absorbs any of your "principal," it presumably entitles to some extent your "interest" also. Do you feel quite certain that the betterment of your various advertising ventures in their matter, manner (or per- adventure in both), might not be possible? Striking effects do not necessitate extended space—(witness this advertisement, which without a prolonged interest in advertisement address Box 287, for "Circular No. 9," You need not be reminded that its "bad form" to open any correspondence with a Postal Card, there-fore, should you write, please, two cents in place of one. This "Circular," No. 9, costing you nothing, is at least worth so much.

**ROSE POLYTECHNIC INSTITUTE**  
TERRE HAUTE, IND.—A COLLEGE OF ENGINEERING. Well endowed, well equipped. Courses in Mechanical, Electrical, Civil Engineering and Chemistry. Extensive Machine Shops, Laboratories, Drawing Rooms, Library. Expenses low. Address **H. T. EDDY, Pres.**

**TINNERS AND ROOFERS,**  
**THIS IS THE APPARATUS**  
AND THIS IS WHAT WE SAY:  
**If Our Burgess Cem No 3**

cannot be worked out of doors or on roofs in all kinds of weather, bring it back and your money will be refunded.

CAN YOU ASK MORE?

All have cast iron cylindrical burners so arranged the solder cannot clog them.

Ask your Jobbers for them or Write for Prices.

Manufactured by **Burgess Soldering Furnace Co., COLUMBUS, OHIO.**



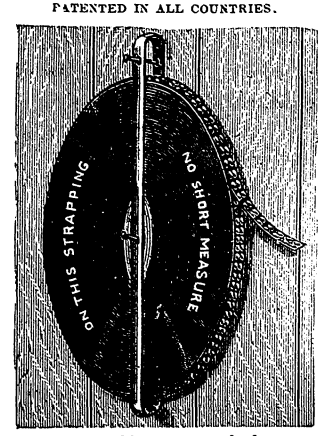
PATENTED IN ALL COUNTRIES.

**INJUNCTION NOTICE.**

**THE U. S. COURT SAYS IN ITS DECISION:**

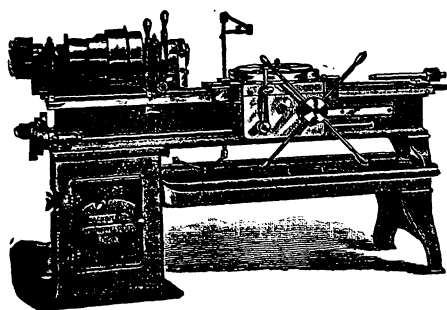
*The defendant admits making and selling Box Straps which clearly contain CARY'S PATENTED INVENTION, although the "Bosses" are shaped differently than those shown in the drawings. "Injunction granted."*

All Goods put up in this style to be genuine must bear the name of the **CARY MFG CO., N. Y.,** stamped on each reel.



Showing Reel hung up ready for use.  
**SIX PATENTS**  
Dated: May 14th, 1889; Nov. 25th, 1890.





HAVE YOU A

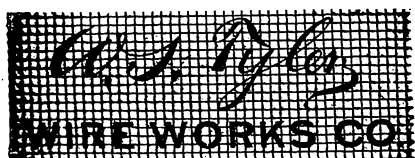
## FLAT TURRET LATHE ?

If not send for

## RAPID LATHE WORK.

JONES & LAMSON MACHINE CO.,

SPRINGFIELD, VT., U. S. A.



MANUFACTURERS OF

BRASS, STEEL AND GALVANIZED  
WIRE CLOTH,

FOUNDRY RIDDLERS, COKE AND  
COAL SCREENS.

W. S. TYLER, Pres. PROCTOR PATTERSON, Sec. & Treas.  
CLEVELAND, OHIO.

LABORATORIES OF

DR. GIDEON E. MOORE,  
221 Pearl St., New York.

DEPARTMENT OF CHEMISTRY. Analyses and  
Assays of Ores, Metals, Waters, Fuel, Oils and  
Natural and Industrial Products of every  
description.

DEPARTMENT OF PHYSICAL TESTS. Chas. F.  
McKenna, Director. Tensile, Transverse and  
Compression Tests of Iron, Steel and other  
Metals and Alloys, Cements, Building Stones  
and Engineering Materials generally. Tests of  
Lubricating Value of Oils, etc., etc.

PRINTED PRICE-LISTS ON APPLICATION

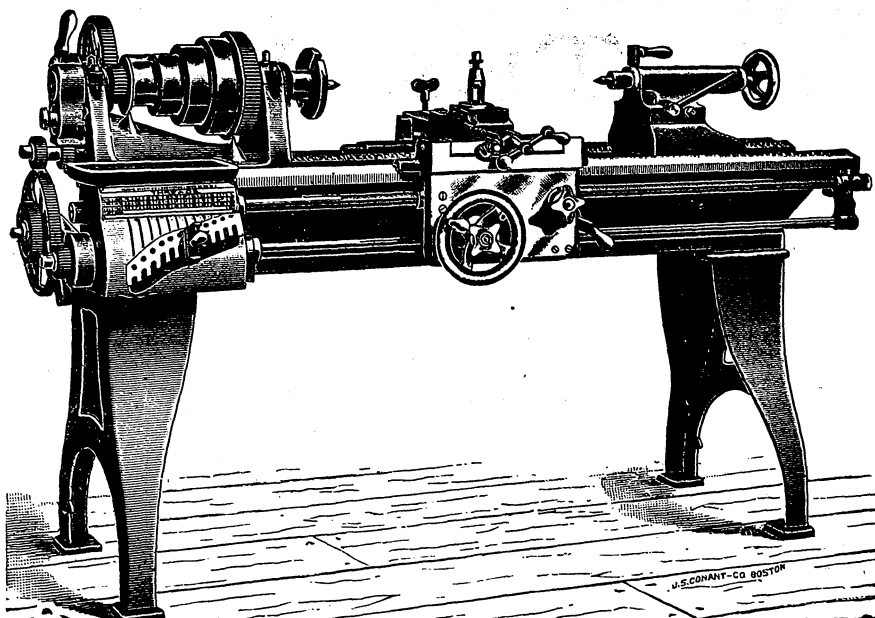
## ALUMINUM.

The Pittsburgh Reduction Co.,

701 Ferguson B'ock, Pittsburgh, Pa.,

Offer Aluminum guaranteed equal  
in purity to the best in the market,  
at lowest rates obtainable.

ALUMINUM SHEET, WIRE,  
AND CASTINGS.



The Henvey Machine Co., Torrington, Conn.

A NEW FEATURE IN SCREW CUTTING ENGINE LATHES. THE HENVEY-NORTON LATHE.

This lathe cuts 12 different screws, from 6 to 20, without changing the gears, and feed changes from 36 to 120 cuts per inch without change. This cut shows a 14-inch x 6-foot Lathe. It has hollow spindle, 1-inch. Has compound or elevating rest, as preferred, or the double carriage rise and fall rest. Also taper attachment if desired. The carriage reverses for screw cutting without the use of the countershaft, from the lever at the end of carriage, allowing the spindle to run in one continuous direction. In stock for immediate delivery, 14-inch, 16-inch and 18-inch, 20-inch and 30-inch in the works. Send for descriptive catalogue.

CHAS. CHURCHILL, Ltd., London, England,  
SCHUCHARDT & SCHUTTE Berlin, Germany, } AGENTS.  
EUGENE SOLLER, Basel, Switzerland,

The Henvey Machine Co., - Torrington, Conn.

## A TREATISE ON TOOTHED GEARING.

Containing complete instructions for Designing, Drawing, and Constructing Spur Wheels, Bevel Wheels, Lantern Gear, Screw Gear, Worms, &c. and the proper formation of Tooth Profiles. For the use of Machinists, Pattern Makers, Draughtsmen, Designers, Scientific Schools, &c. With many plates. By J. Howard Cromwell. 12mo, cloth. \$1.50.

Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller,  
96-102 Reade Street, NEW YORK.

## DO YOU BORE CYLINDERS?

### THE HORIZONTAL BORING MACHINE

IS A SPECIAL TOOL FOR THIS PURPOSE.

SEND FOR PARTICULARS TO

NEWARK MACHINE TOOL WORKS  
NEWARK, N. J.

J. A. FAY & Co., CHICAGO, WESTERN AGENTS.

## The Stearns = = =

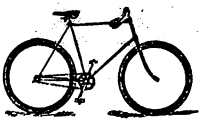
IF YOU RIDE A  
BICYCLE YOU  
OUGHT TO  
RIDE THE  
BEST.

THE  
BEST IS  
THE CHOICE  
OF OLD RIDERS.

= = The Stearns

E. C. STEARNS & CO., Syracuse, N. Y.





# ECLIPSE BICYCLES.

MODEL A	- -	\$125.	MODEL B	- -	\$100.
LADIES'	- -	125.	LADIES' F	- -	100.
MODEL E	- -	85.	LADIES' D	- -	85.

Each Model the best value at its price. Six Thousand Riders of our 1894 machines can testify to their excellent qualities. Liberal prices to the Hardware trade.

**ECLIPSE BICYCLE COMPANY, - Beaver Falls, Pa.**

**THE WILLIAMS PRINTING CO.,**

## Commercial Printers AND Binders.

ESTIMATES FURNISHED FOR ALL CLASSES OF WORK.

**96, 98, 100 and 102 READE STREET, - NEW YORK.**

## WHITE MOUNTAIN FREEZERS.

**THE  
BEST  
FREEZER.**

Heavy Waterproof Tubs. Cans of Charcoal Tin-plate. Malleable Iron Dashers. All inside parts tin-plated. Gearing completely covered.

**THE  
BEST  
SELLER.**

**The White Mountain Freezer Co., Nashua, N. H.**



The true test of a Freezer is how well it performs its work; in this respect the unsolicited testimony of thousands pronounce the "Packer Freezers" unexcelled.

### GOOD LUCK, STANDARD, AND CONFECTIONERS' MACHINE FREEZERS.

The "Good Luck" is the latest and best low price Freezer on the market. Inside Castings Tinned, Malleable Iron Fittings, Automatic Scraper. White Cedar Pails with Galvanized Steel Hoops. Pine Pails, or Wire Rings with bottom of pail unprotected are not used.

**CHAS. W. PACKER, Mfr., 20 N. Fourth St., Philadelphia.**

**We  
Have  
Bought  
From  
The  
Shepard  
Hardware  
Company of  
Buffalo**

**ALL THEIR PATENTS, PATTERNS AND TRADE-  
MARKS, &C., OF THE**

### "ORIGINAL" CLARK

**Blind, Shutter and Gate Hinges,  
Latches and Frame Pulleys,**

And will in future manufacture same and fill all orders direct from our factory.

**WRIGHTSVILLE HARDWARE CO.,**

**WRIGHTSVILLE, PA.**

## INSTRUCTION BY MAIL

In Architecture,  
Architectural Drawing,  
Plumbing, Heating and Ventilation,  
Bridge Engineering,  
Railroad Engineering,  
Surveying and Mapping,  
Electrical Engineering,  
Mechanical Drawing,  
Mining,  
English Branches, and

### MECHANICS.

Diplomas awarded. To begin students need only know how to read and write. Send for FREE Circular of Information stating the subject you think of studying to THE CORRESPONDENCE SCHOOL OF MECHANICS AND INDUSTRIAL SCIENCES, Scranton, Pa.

**4000 STUDENTS.**



### Gem Ice Shave.

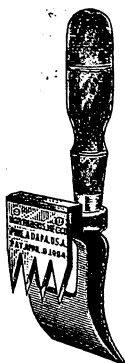
For shaving ice from blocks without removing from refrigerator. Shaved ice is required for cooking cantaloupes, melons, tomatoes, and other fruit, for oysters and clams on half shell, for cooling wines, liquors, lemonades, iced drinks, for use at soda fountains, bar rooms, restaurants, etc.

List Price, \$6.00 per dozen, less discount.

### CROWN ICE CHIPPER.

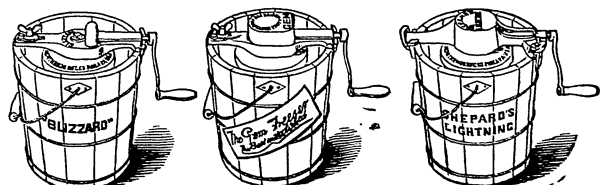
The only simple, effective and cheap tool for chipping ice to use in freezers in place of old-time bag and hatchet. Reduces ice quickly to small uniform pieces, size of peanuts. Used with great advantage to chip ice for soda fountains, bar rooms, restaurants, etc.

List Price, \$6.00 per dozen, less discount.



### The BEST FREEZERS

**HAVE** Pails made of Virginia White Cedar with Electric Welded Wire Hoops. Guaranteed not to fall off.



**STRONGER—HANDSOMER—LAST LONGER.**

For Particulars, Prices and Discounts, write

**NORTH BROS. MFG. CO., - PHILADELPHIA, PA.**

New York Agents, JOHN H. GRAHAM & Co., 113 Chambers St.

# REID DRILL CHUCKS.

## THREE SIZES.

No. 0 takes any drill from 0 to 1-2 inch inclusive.

No. 1 " " " " 0 " 3-4 " "

No. 2 " " " " 0 " 1 " "



They are the strongest and most durable made. Drill absolutely in the center. No twisting or bending necessary if drill is straight. Can be fitted to hollow spindle lathes for working long rods.

SEND FOR CIRCULAR.

R. H. BROWN & CO., - New Haven, Conn.

*You take no risk on the quality.  
We make only the best!*



**Sand Papers** { Flint Paper  
Garnet Paper  
Emery Paper  
Emery Cloth  
in Reams and Rolls

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

**BAEDER, ADAMSON & Co.**

730 MARKET STREET, PHILADELPHIA.  
67 BECKMAN STREET, NEW YORK.  
143 MILK STREET, BOSTON.  
182 LAKE STREET, CHICAGO.

## THE GEM SOLID STEEL MINCER



Single  
and  
Double Blades

Handle and Blade Formed in one piece.  
Always Clean. Indestructible.  
No Rivets to Wear Loose.  
No Wooden Handle to Shrink, Swell, loosen,  
Split, or Fill with Rancid Grease.

MANUFACTURED BY  
**PALMER HARDWARE MFG. CO.**  
TROY, N. Y.

# ROLLER JACK SCREW.



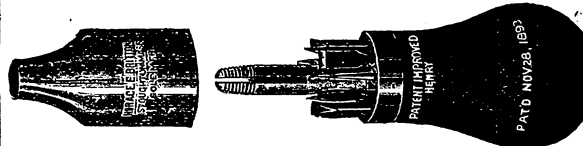
We have experimented much with ball bearing Jacks, and found them very satisfactory when not heavily loaded. Now, instead of balls we put in rollers, as seen in cut. These rollers will stand any load that the Jack will carry, and are not liable to get out of order. We have thoroughly tested these Roller Jacks with a spring balance and find a saving of forty per cent. of power needed to lift a given weight.

The price is about ten per cent. more for Roller Jacks, and the gain is 75 per cent. This ought to insure their sale as fast as the facts become known.

## MILLERS FALLS CO.,

93 READE STREET, - - - NEW YORK.

## PATENT IMPROVED



**HENRY COMBINATION HAFT,**  
Containing five Brad-Awls, one Chisel, Screw Driver, Diamond Point Awl, Marking Awl, Counter Sink, Tack Puller and Reamer. Send for Circular of full description and illustration. If you would have the Best, get the Patent Improved. Sent post-paid on receipt of \$1.00.

HORACE E. BRITTON, Patentee and Sole Manufacturer, STOUGHTON, MASS.

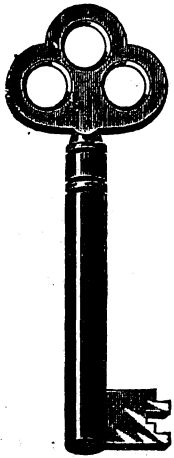


**THE WONDERFUL FORSTNER AUGER BIT ?**  
If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 55 cents. It will bore Round, Oval and Square Holes, and cannot be equaled for fine carpentry, cabinet or pattern work. Discount to dealers on application.  
FOR SALE BY ALL HARDWARE DEALERS  
THE BRIDGEPORT GUN IMPLEMENT CO.,  
Depot for Sales. 313 and 315 Broadway, New York.

**BOOKS** YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS, Publisher** and Bookseller, 96-108 Reade Street, New York.

# CABINET LOCKS

OF EVERY KIND.



DRAWER LOCKS,  
CUPBOARD LOCKS,  
WARDROBE LOCKS,  
CHEST LOCKS,  
DESK LOCKS.

A complete line of more than 1000 list numbers exclusive of our old  
and complete line of

**YALE CABINET LOCKS.**

**THE YALE & TOWNE M'F'G CO.,**

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.



The only question is

## Is it Le Page's?

If it is you have made a sale. **HUNDREDS of THOUSANDS of PLEASED and SATISFIED CUSTOMERS** testify to the merits of

**LE PAGE'S LIQUID GLUE.**

If you sell it you do not have to **WASTE ANY TIME** in answering questions as to its quality.

The people **KNOW** that **LE PAGE'S GLUE** is the **BEST**. They have used it for years and have proved our claims to be true.

It is the only Glue made **WITHOUT ACIDS**.

A dealer who regards his time as worth anything will not risk losing his **CUSTOMERS' CONFIDENCE** by trying to sell something which is **CLAIMED** to be 'just as strong' and 'just as good as LePage's.'

Don't let your customers go to another store for what they want, but **SELL THEM WHAT THEY ASK FOR**.

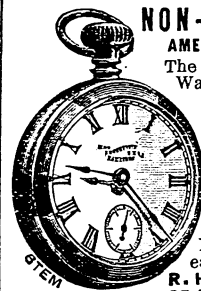
We can furnish original and attractive advertising matter for "**LE PAGE'S GLUE**" upon request.

**SEND FOR CIRCULARS AND PRICE-LIST.**

**RUSSIA CEMENT CO., Gloucester, Mass.**

NEW YORK OFFICE, 95 Reade and 113 Chambers Streets.

PACIFIC COAST OFFICE, 23 Davis St., San Francisco, Cal.



**NON-MAGNETIC \$2.00**  
AMERICAN WATCH.

The Premium Non-Magnetic Watch has a specially constructed American Lever Movement, in Case of non-conducting metal, and is fully warranted to withstand any attempt at magnetization, and to keep accurate time around or against a dynamo. Every dynamo hand wants them. Mailed postpaid for \$2.00 each; 3 for \$5.; 1 doz., \$18.00. **R. H. INCERSOLL & BRO.,** 65 GORTLANDT STREET, NEW YORK.

— **REMEMBER** —

WE MAKE ONLY

The Very Highest Grade  
OF  
**MECHANICS' TOOLS.**

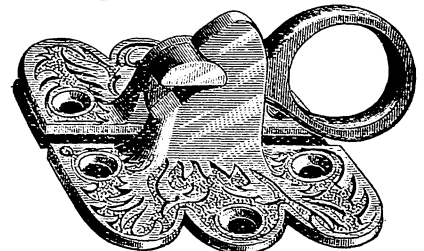
**H. H. MAYHEW CO., Shelburne Falls, Mass.**

"CONROY"

**Refrigerator Door Fasteners**

Have rapidly supplanted all others.

**Refrigerator Trimmings.**



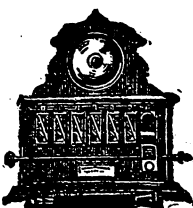
**P. J. CONROY & CO., Paschall, PHILADELPHIA.**

## American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet  
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.  
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

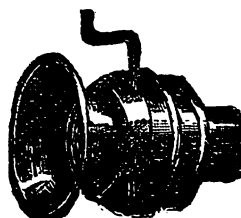


**W. R. OSTRANDER & CO.,**

204 FULTON STREET, NEW YORK,  
Manufacturers of

**SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC  
MECHANICAL AND PNEUMATIC ANNUNCIATORS  
AND BELLS.**

Complete outfits of Speaking Tubes, Whistles,  
Electric, Mechanical and Pneumatic Bells. A full line  
always in stock. Send for new catalogue. Factory,  
DeKalb ave. near Knickerbocker, Brooklyn, N. Y.



# W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

## Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

## DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

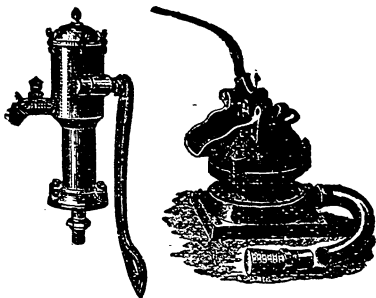
A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 209.

Fig. 381.

Fig. 145.



or wherever it is desired to raise a large quantity of water by  
hand power.

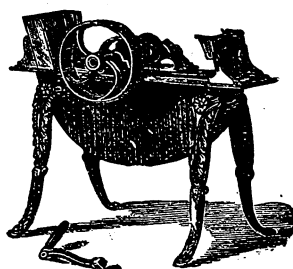
The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

### CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.  
Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

**THE DEMING**  
FACTORY  
SALEM O.U.S.A.  
MANUFACTURERS OF  
HAND & POWER PUMPS, WELL SUPPLIES & C. VERTICAL STEAM PUMPING ENGINES.  
N.Y. OFFICE: 72 JOHN ST.  
HENTON & HUBBELL  
GEN'L. WESTERN AGTS.  
55 & 57 N. CLINTON ST.  
CHICAGO, ILL.

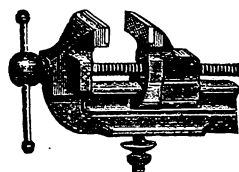
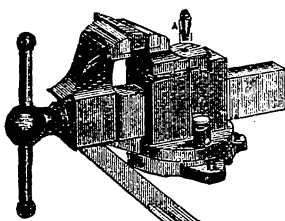
ARTESIAN WELL CYLINDERS, HYDRAULIC RAMS

## PRENTISS' PAT. VISES.

The Leaders for 20 Years

Send for Illustrated Catalogue of

ALL KINDS OF VISES.  
PRENTISS VISE COMPANY,  
MANUFACTURERS,  
44 Barclay St., New York.



## F.E. MYERS & BRO.

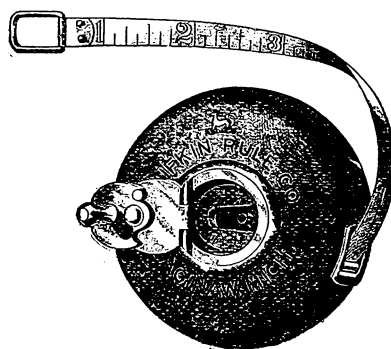
**LIFT PUMPS**  
THE LARGEST PUMP WORKS  
EXCLUSIVELY  
UNITED STATES  
ASHLAND, O.  
+ CATALOGUES FREE +  
Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter.  
"The Manhattan Dumb Waiter."  
"The Improved Humphrey Hand Elevator."  
Made specially to be sold by Hardware Stores.  
Thousands in use. Catalogues on application.  
**THE STORM MANUFACTURING CO.**  
NEWARK, NEW JERSEY.  
Formerly of Poughkeepsie, New York.

**SPEAKING TUBE ETC.**  
J.F. WOLLENSAK  
CHICAGO, ILL.

**THEATRICAL HARDWARE**  
FOR  
SEND ILLUSTRATED PRICE LIST

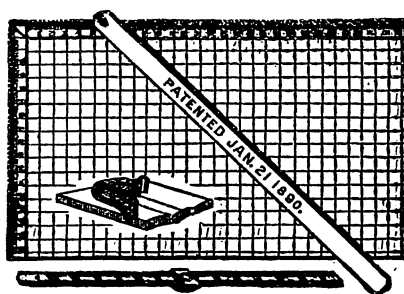
## "RELIABLE" Steel Measuring Tapes.



Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval.

**LUFKIN RULE CO., - SAGINAW, MICH.**

NEW YORK OFFICE, 2½ MURRAY ST.



## The Canton Glass Board.

Cuts any Fraction of an inch by Eighths.

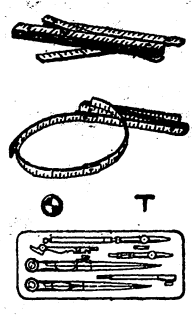
Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

— ALSO —

**IMPROVED TRAMMEL RULE for Cutting Circles**  
From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

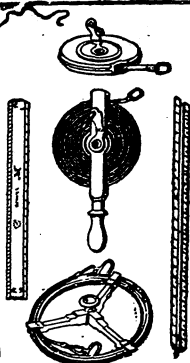
Send for Circular.

**The Canton Saw Co., Canton, Ohio.**



**KEUFFEL & ESSER CO.** • NEW YORK •  
 BRANCH: CHICAGO.  
 FACTORIES: HOBOKEN, N.J.

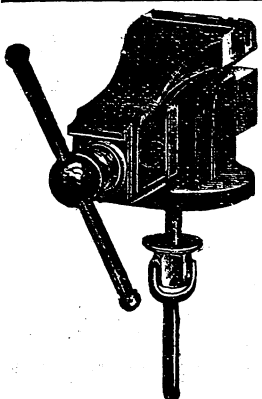
**MANUFACTURERS OF EXCELSIOR MEASURING TAPES.**  
**SUPERIOR QUALITY, LATEST IMPROVED. GREATEST VARIETY.**  
 STEEL • METALLIC • LINEN • POCKET TAPES.  
**EXCELSIOR BAND CHAINS FOR SURVEYORS, LAND CHAINS, &c.**  
**K & E CO FOLDING POCKET RULES.**  
**NO WARPING, NO SHRINKING, NO ILLEGIBLE JOINTS, NO BULK.**  
 2. 3. 4. 5. 6. 8 FOOT, ALSO WITH PATENT SPRINGS.  
 FLAT & TRIANGULAR BOXWOOD SCALES, BEST MADE.  
**PLUMB BOBS, THUMB TACKS, DRAWING INSTRUMENTS.**  
**PRICE LISTS & QUOTATIONS PROMPTLY SENT.**



**IRON INSTEAD OF WOOD.**  
**GALVANIZED IRON**  
**TUBING and CURB,**  
 — FOR —  
**CHAIN PUMPS,**  
 (Kegler's Patent)  
 Are Giving Universal Satisfaction,  
**BECAUSE:**  
 They do not rust and accumulate filth—always clean. Extreme lightness is combined with strength and durability. No freezing. No waste of water by reason of enlarged reservoir at top of tubing. No annoying wheel at bottom. Easy to handle.  
 Tubing weighs less than 1/4 lb. per ft., is connected by couplings and can be attached to any make of curb.  
 Send for Catalogue.  
**Bellevue Pump Co., Bellevue, Iowa.**



**Athol Machine Co.,**  
 Selling Agents.



**HOLLANDS' OFFSET JAW VISE.**

Specially adapted for drill press work where chucks cannot be used and equally good for special or regular bench work.

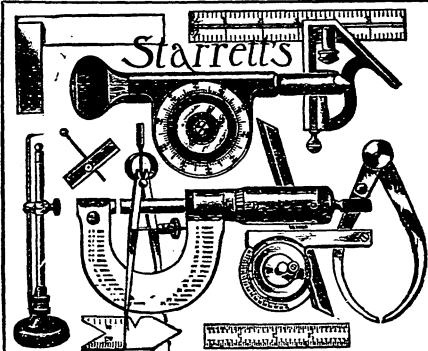
**Hollands Mfg. Co.**  
**ERIE, PA.,**  
 Manufacturers all styles VISES.

**THOMAS CLARKE**  
**HARDWARE AND GENERAL AGENT.**  
 (FIRST-CLASS REFERENCES.)  
**60 PRINCE WILLIAM ST., ST. JOHN,**  
**NEW BRUNSWICK.**

Skilled mechanics prefer them

Live dealers sell them

# STARRETT'S



# FINE TOOLS

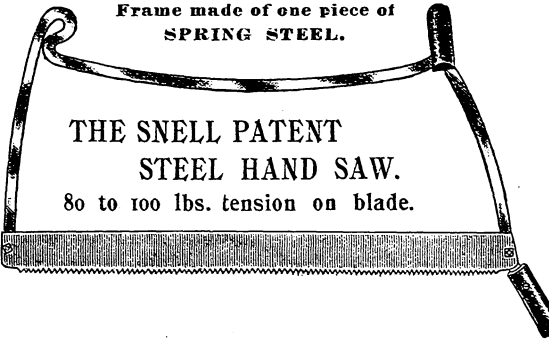
Best in workmanship  
 Finest in finish  
 Latest in improvements

For all workers in metal or wood  
 Every tool warranted satisfactory

Send for Catalogue      L. S. Starrett, Athol, Mass.

Frame made of one piece of  
**SPRING STEEL.**

**THE SNELL PATENT**  
**STEEL HAND SAW.**  
 80 to 100 lbs. tension on blade.

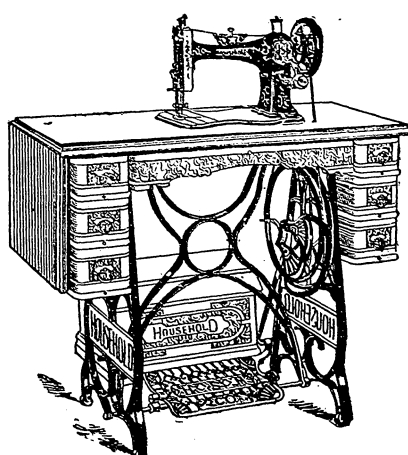


**WILL NOT BEND NOR BREAK.**  
**FACTORY, 330 to 338 First Street, So. Boston.**

This saw is always ready for use. Never has to be adjusted after blade is put in. Will last a life-time.

Send for Descriptive Circular and Prices to

**Butler Mfg. Co.,**  
 P. O. BOX 2180,  
**BOSTON, MASS.**



**THE EASY RUNNING**  
**"HOUSEHOLD" SEWING MACHINE**

Received Highest Award at the World's Fair.

Unequaled for Capacity, Simplicity, Durability and Modern Construction.  
 It is the Best Sewing Machine in the world.  
 Dealers wanted in all unoccupied territory.

**Household Sewing Machine Company,**  
**Providence, R. I.**

S East 14th St., New York. 40 West St., Boston.  
 141 Lake St., Chicago.

GEO. N. CLEMONS, PRES.

S. S. BATTIN, Vice-Pres.

ROBERT J. JOHNSON, Treas.

F. B. EARLE, Sec.

# THE NATIONAL SAW CO.,

OPERATING

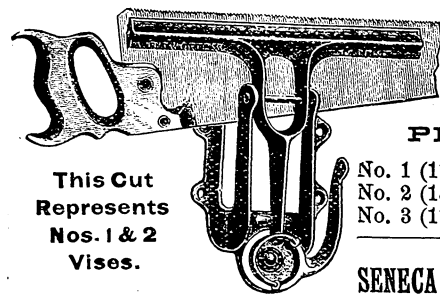
Wheeler, Madden & Clemson Mfg Co., Wood-rough & McParlin, Richardson Brothers, Harvey W. Peace Co., Monhagen Steel Works, Wood-rough & Clemson, Pennsylvania Saw Co.

SEND FOR PRICE-LIST.

GENERAL OFFICE:  
NEWARK, - - New Jersey,

# SAWS

## WENTWORTH'S PATENT NOISELESS SAW VISES, WITH RUBBER CUSHIONED JAWS.



This Cut  
Represents  
Nos. 1 & 2  
Vises.

Prevent all vibration and render Saw Filing noiseless.  
Will make no more noise than Filing on a Solid Piece of Iron.

Have a Larger Sale than All Other Kinds Combined.

### PRICE LIST.

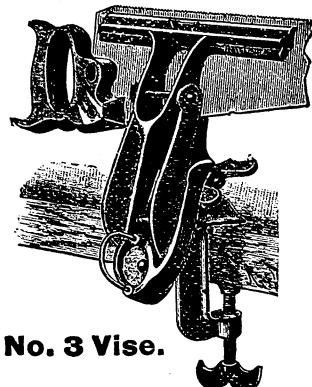
No. 1 (11 inch Jaws),	-	PER DOZ. \$15.00
No. 2 (15 inch Jaws),	-	21.00
No. 3 (11 inch Jaws),	-	18.00

### LIBERAL DISCOUNT TO THE TRADE.

LONGEST JAWS, HEAVIEST AND  
BEST FINISHED.  
Sold by all leading jobbers of gen-  
eral Hardware at Factory Prices.

—MANUFACTURED BY—

SENECA FALLS MFG. CO., 255 Water St., Seneca Falls, N. Y.



No. 3 Vise.

## NEW ADJUSTABLE BENCH LEVEL.

WITH GROUND AND GRADUATED VIAL.

4-6 and 8 inch.



Three Sizes.

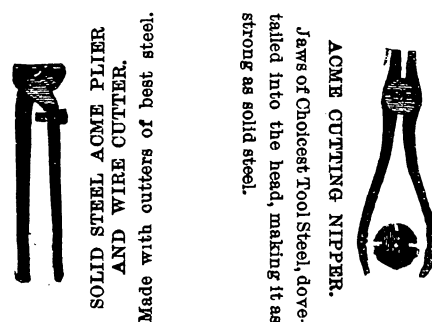
MANUFACTURED BY

C. F. RICHARDSON & SON,

ATHOL, MASS.

## ACME CUTTING TOOLS.

Made in all Sizes.



SOLID STEEL ACME PLIER  
AND WIRE CUTTER.  
Made with cutters of best steel.

ACME CUTTING NIPPER.  
Jaws of choicest Tool Steel, dove-  
tailed into the head, making it as  
strong as solid steel.

HIGGANUM HARDWARE CO., HIGGANUM, CONN.

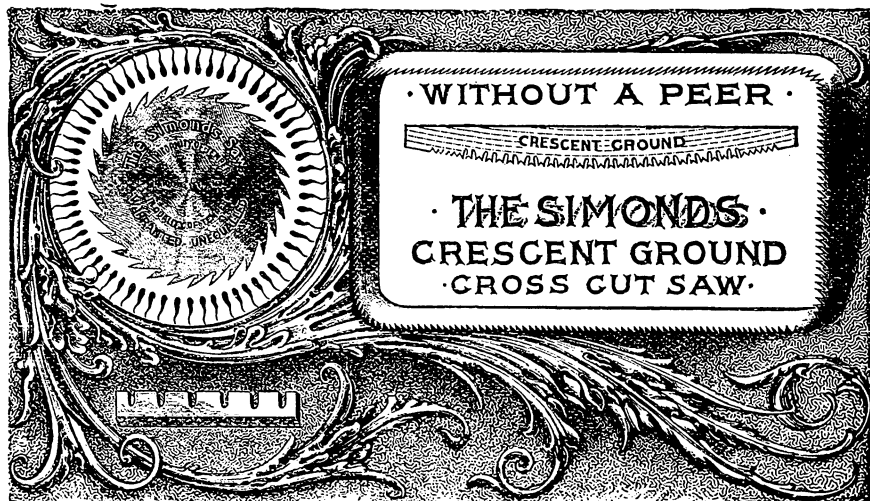
New York Office, 18 Cliff Street.

JOHN LOYD,



Machine Knives, Shear Blades,  
Presses and Dies.

Nos. 558 to 562 Water Street, New York



· WITHOUT A PEER ·

CRESCENT GROUND

· THE SIMONDS ·  
CRESCENT GROUND  
CROSS CUT SAW.

Simonds Mfg Co. Simonds Saw Co.  
FITCHBURG, MASS. CHICAGO, ILL. SAN FRANCISCO CAL. PORTLAND, ORE.

## The Taintor Positive Saw Set

Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

For Prices and Discounts, address

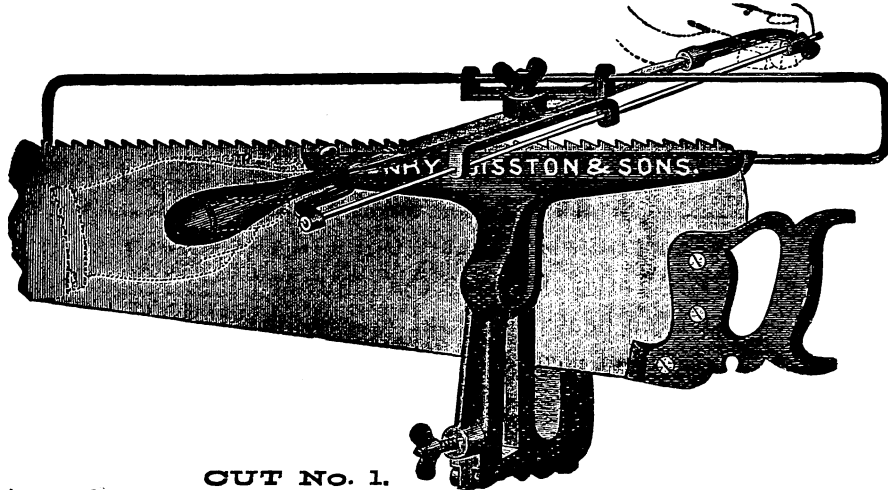
WIEBUSCH & HILGER, LTD., SOLE AGENTS,  
84 and 86 Chambers Street, NEW YORK.





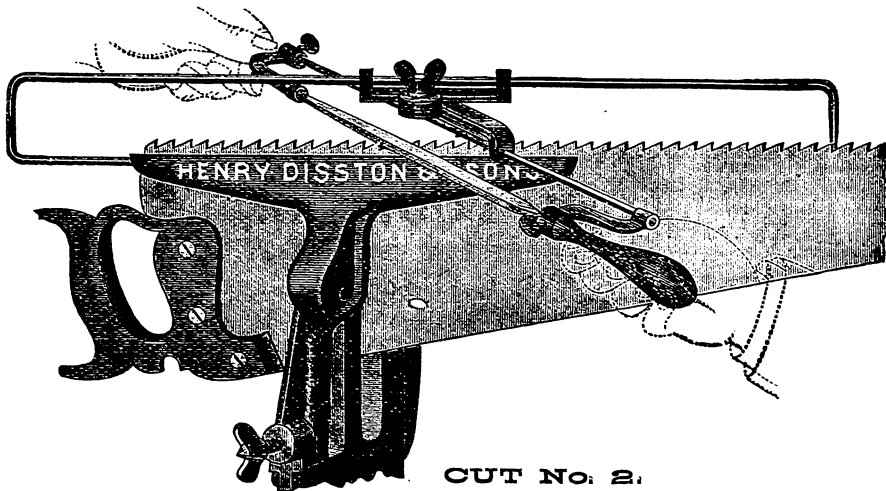
# DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART  
OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1.

Cut No. 1 shows a saw and the attachment in proper position for filing the first side; and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.

To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.

Write for price including No. 3 Clamp, Filing Guide, File and Handle complete: Packed one in a wooden box.

**Henry Disston & Sons, Philadelphia, Penn.** INCORPORATED.



# ARCADE FILE WORKS.

## WARRANTED FILES AND RASPS.

EASTERN OFFICE,  
NEW YORK.

FACTORY  
ANDERSON, IND.

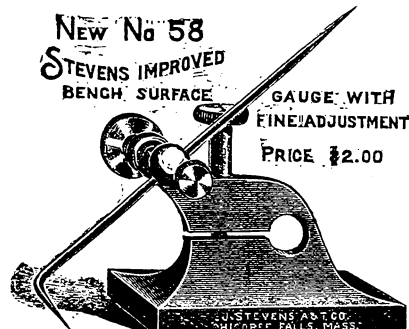
WESTERN OFFICE,  
CHICAGO.

## THE FILES THAT LEAD THEM ALL

THE BEST EQUIPPED FILE WORKS IN THE WORLD.

The fact that the Arcade File Works alone use the improved File Machinery recently invented by Alfred Weed, and the even heat of natural gas, enables them to produce files that cut faster and wear longer than any on the market.

**Bench Surface Gauge**  
For Machinists, Tool Makers, Model  
Makers, Die Sinkers and others.



**New No 58**  
**STEVENS IMPROVED**  
**BENCH SURFACE**  
**GAUGE WITH**  
**FINE ADJUSTMENT**  
**PRICE \$2.00**

The various uses to which this little instrument can be applied place it, in the estimation of all who have used it, as one of the most useful tools known to mechanics. We have lately remodeled it, making it a much more practical tool than it was before. The base has been made much broader, the clamping device for holding the needle has been made to hold much stronger, and a fine adjustment has been added, making it by far the most desirable tool of its kind on the market. Some of the uses to which it can be put: It can be used on the planer or milling machine to set two or more parts of work at the same height. It may be used on a surface plate in laying off the centre of a piece of work, or in laying out jigs, gauges, dies, templates, models, etc. It can also be used as a depth gauge, and as a scratch gauge.

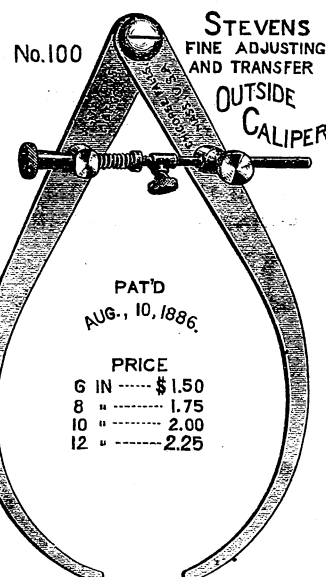
Send for Catalogue of Com-  
plete Line

## FINEST Mechanical Tools.

**J. Stevens Arms  
& Tool Co.,**

P. O. Box 5729,

**CHICOPEE FALLS, - MASS.**



**PAT'D**  
**AUG., 10, 1886.**

**PRICE**

6 IN	-----	\$1.50
8 "	-----	1.75
10 "	-----	2.00
12 "	-----	2.25

**FACT.**

Not how cheap, but how good is an excellent rule to follow in buying FINE TOOLS.

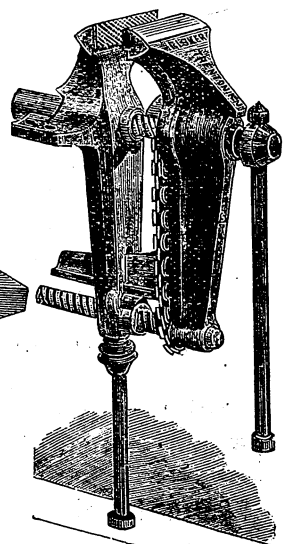
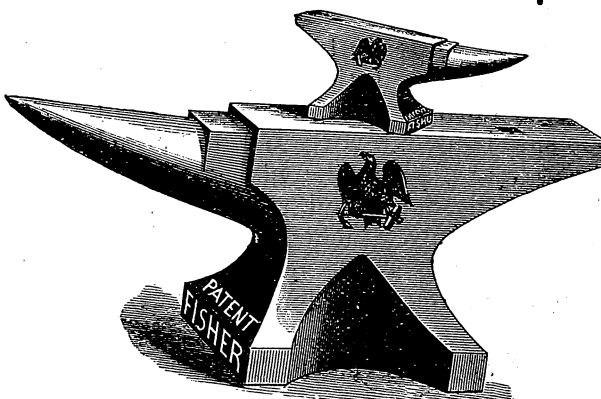
## Warranted Better than the Best ENGLISH ANVIL

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

## FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

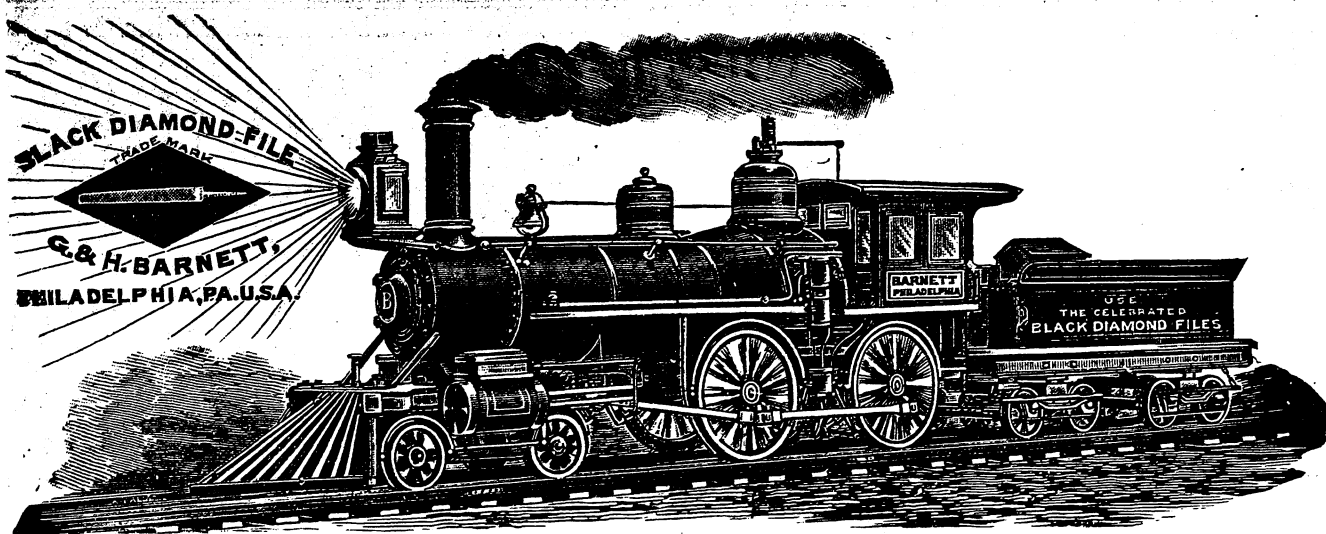
ESTABLISHED 1843.  
MORE THAN 200 DIFFERENT PATTERNS.  
None Genuine without our Trade-Mark.  
**EAGLE and "FISHER" Stamp.**



**EAGLE ANVIL WORKS,**

**Trenton, N. J.**

Sold in New York by our Agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co., 45 Chambers St.



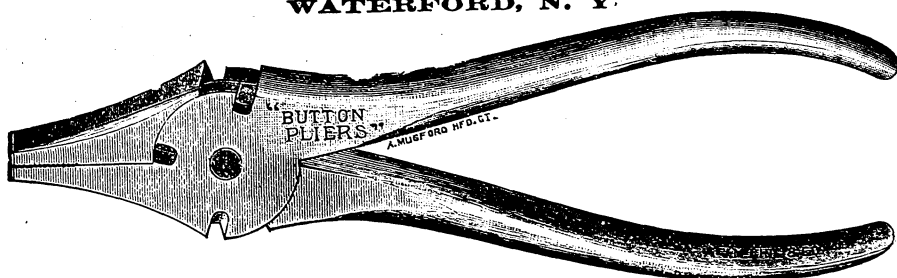
THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

**NICHOLSON FILE CO.**  
PROVIDENCE, R. I.

3000  
VARIETIES FILES  
[X.F.] AND INCREMENT CUT FILES

**J. M. KING & CO.,**  
WATERFORD, N. Y.

Manufacturers of  
**BUTTON'S**



**Pat. Wire Cutter  
AND PLIER COMBINED.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

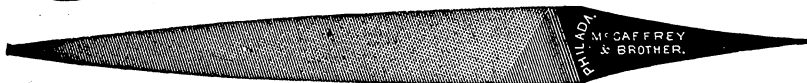
Established by DANIEL B. KING, 1829.

Philadelphia, 1876.



**McCaffrey File Co.,**  
FIFTH and BERKS STS.,  
PHILADELPHIA, PA.

For Superiority.



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

*Superiority acknowledged wherever used, sold or exhibited.*

BEST  
CRUCIBLE  
STEEL.

**"TROJAN" HORSE RASPS AND FILES.**

LOWEST  
IN  
PRICE.

STRONGEST  
TOOTH.

**BANKER & WHITE,**

(Troy File Works.)

**TROY, N. Y.**

N. Y. Agent GEO. M. MATTESON 111 Duane St.

LET  
US  
QUOTE

**HOWARD IRON WORKS,**  
BUFFALO, N. Y.,

Manufacturers of

**BOLT CUTTERS**

AND NUT TAPPING MACHINES,

(Schlenker's Patent),

Send for Illustrated Catalogue.



**WM. KROGSrud,**  
Engraver and Die Sinker,  
61 Fulton St., N. Y.  
Manufacturer of  
**STEEL STAMPS**  
For Every Purpose.  
Steel Letters and Figures.  
Burning Brands, Stencils,  
&c. Send for Illustrated  
Catalogue.



**3** NICKLE, Silver and Bronze Metallic  
Figures and Letters, Sizes 1/4 in to 3 in.  
Pattern Letters, Steel Stamps, Brands,  
Dies &c. Send for Reduced Price List.  
We make a specialty of the Hardware Trade.  
**A. A. WHITE & CO., Providence, R.I.**

TRADE MARK



# John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority,  
against all Competitors, from

**THE YEAR SEVENTEEN HUNDRED & FIFTY,**  
and are still in increasing demand. As in the past, it is the unalterable  
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

SOLE AGENTS FOR THE UNITED STATES.

Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.

## The Amidon Tool Corporation,

Manufacturers of  
A Complete Line of

### Bit Braces

1451 Niagara St., Buffalo, N. Y.



CORNER BRACE.

## AMERICAN TOOL COMPANY,

NEW YORK,  
MANUFACTURERS OF

### TOOL CHESTS

Of all sizes, complete with tools, for Hardware, Toy,  
Notion and Variety trades.

Factory and Salesroom,

200 West Houston Street, near Varick.  
Also Machinists' Tool Chests, empty. Illustrated Cata-  
logue and prices furnished on application.

WRITE TO

## The Bourke Manufacturing Co.,

YOUNGSTOWN, OHIO,

For catalogue and discounts on

Ventilating Sash Lock and Fastener,  
Diagonal Sash Lock and Fastener,  
Extension Handle Couplings,  
Galvanized Iron Window Cleaners,  
Floor Scrubbers and Dryers,  
Excelsior Bar Cleaners.  
Combination Brush, Mop and Sponge Holder.

## F. S. HUTCHINSON CO.,

Paragon Self-Retaining Dumb Waiters,

HAND AND BELT POWER ELEVATORS,

Aldrich Building, 32 Warren Street,  
NEW YORK.

## SPECIAL BRONZE HARDWARE

MADE TO ORDER.

Ransom Hardware Co., Burlington, Vt.

COMMON MOUSE TRAPS  
BEST FOR USE!

Ripley Mfg. Co., Unionville, Conn



Porcelain-Lined Lemon Squeez-  
ers, Steak Hammers, Boot Jacks  
Magnetic Tack Hammers, Mal-  
lets, Bung-Starts, Hand Screws  
Beacon Hill Pat. Mouse Traps  
Sunny-Side 2 lb. Lap Board

ESTABLISHED 1816.

## WHITE, VAN GLAHN & CO.,

15, 16 and 17 CHATHAM SQUARE, N. Y.,

SOLE AGENTS IN THE U. S. FOR THE CELEBRATED

## J. B. Addis & Sons' Wood Carvers' Tools.

Lawn Mowers, Barb Wire, Green Wire Cloth, Poultry  
Netting and Farming Tools, Refrigerator Hard-  
ware and Condit's Ice House Fasteners.

## SICKELS, SWEET & LYON,

Wholesale Hardware.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

## Carry Stock of Jackson, Mich., Farming Tools

Shipments from Factory if preferred.

N. Y. AGENTS FOR

Cortland Door and Window Screen Co., Union Steel Screw Co., Eagle  
File Co., Perfection and New Easy Lawn Mowers.  
Spring Catalogue No. 7 issued in February.

SHARP TOOLS are a NECESSITY to a good workman,  
But without a GOOD WHETSTONE they are an impossibility.

That is why it is always economy to buy

## PIKE'S WHETSTONES.

Pike's Indian Pond Scythe Stone, Strong, Sharp  
Grit, Quick Cutting.

Scythe Stones.

Oil and Water Stones.

GREEN MOUNTAIN,  
LAMOILLE,  
BLACK DIAMOND,  
PREM. QUINNEBAUG,  
WHITE MOUNTAIN,  
GENUINE RAGO,  
WILLOUGHBY LAKE.

WASHITA,  
ARKANSAS,  
HINDOSTAN,  
WATER-OF-AYR,  
RAZOR HONES,  
TABLE HONES,  
AXE STONES, ETC.



## THE PIKE MFG. CO., - Pike Station, N. H.

DIRECTIONS FOR USING

## WILLIAMSON'S NEW POWER CORK SCREWS.

KEEP ON TURNING, DO NOT PULL.

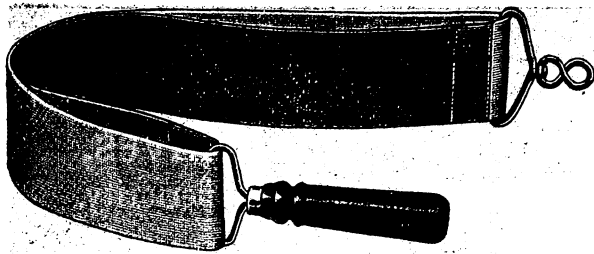
No. 1243, Nickel Plated, Apple Wood Handle, \$5.00 per dozen.  
1443, " " " Rosewood 6.50

For Discounts and Prices of other styles send for Catalogue.

C. T. WILLIAMSON WIRE NOVELTY CO., NEWARK, N. J.

Manufacturers of Wire Specialties for the Trade.





WE make every variety of  
**Razor Strop**  
and more of them than any other concern.

Our Prices are low. Our Goods Standard. Shall we send you our catalogue? Send postal card request for it. P. O. Box, No. 1015.

**J. R. TORREY & CO., Worcester, Mass.**

"Stamped with the BUCK'S HEAD."



TRADE-MARK  
TRADE-MARK.

**BUCK BROTHERS,**  
MILLBURY, MASS.

The Most Complete Assortment in the U. S. of  
Shank, Socket Firmer and Socket Framing  
Chisels, Fine Bevel Edge Chisels, Plane Irons.

**TWO PRIZE MEDALS,**

No. 1098 and No. 1099, AT WORLD'S FAIR.

Buyers are cautioned against any parties who claim a recent connection (or any connection for over 20 years) with Buck Bros., or who represent goods as our make not stamped with the BUCK'S HEAD or BUCK BROTHERS in full.

ESTABLISHED, 1825.

**R. HEINISCH'S SONS CO., NEWARK, N. J.**

INCORPORATED, 1892.

New York Office, No. 90 Chambers Street



Tailors' Shears, Trimmers, Scissors,  
Tinners' Snips, &c.

CATALOGUES AND PRICES ON APPLICATION.

We have no contract with Messrs. Hermann Boker & Co. as Agents for the sale of our goods.

HIGHEST AWARD PARIS EXPOSITION, 1889.



**THE L. & I. J. WHITE CO.,** MANUFACTURERS OF **EDGE TOOLS.**  
BUFFALO, N. Y. Coopers', Carpenters' and Ship Tools, Plane Irons, Cleavers, &c. Full Line Chisels.

1853

1894

Highest Awards at the World's Exposition for Superior Tools.



**CHARLES BUCK,**

sole surviving member of the original firm of BUCK BROS., and proprietor of the  
**MILLBURY EDGE TOOL WORKS, MILLBURY, MASS.,**

Manufacturer of the

**GENUINE STANDARD BUCK TOOLS.**

All kinds of Shank, Socket Firmer Chisels and Gouges, Cut and Double Irons, S. D. Bits, etc. Send for Catalogue. CAUTION.—Buyers wanting the standard Buck Tools will see that they get only those stamped CHARLES BUCK when ordering from the jobbing houses. Address all correspondence to CHARLES BUCK or the

Millbury Edge Tool Works, Millbury, Mass.

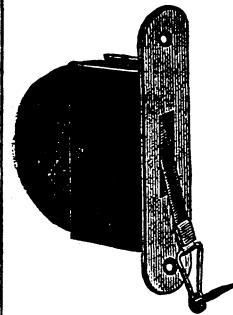
## Cast Shears.

**ACME SHEAR CO.,**

**BRIDGEPORT, - CONN.**

## PULLMAN Steel Frame Sash Balance.

Oldest and largest producers of a perfect working Spring Sash Balance in the world. Every Balance warranted. Re-



quire no box frames. Our prices lowest, our Balance the best. For sale by all leading Hardware dealers in the United States.

Write for Prices.

**PULLMAN SASH BALANCE CO., Rochester, N. Y.**

New York Office, 142 Chambers St.

Chicago Office, 235 Lake St.

IF YOU WANT THE BEST  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER.  
IF NOT SUPERIOR TO ANY OTHER.  
WE HAVE BEEN IN BUSINESS SINCE 1840.  
**BOARDMAN & SON**  
BRITANNIA SPOONS  
HADDAM, CONN.

IF YOU WANT THE BEST  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER.  
IF NOT SUPERIOR TO ANY OTHER.  
WE HAVE BEEN IN BUSINESS SINCE 1840.  
**BOARDMAN & SON**  
NICKEL SILVER SPOONS  
HADDAM, CONN.

IF YOU WANT THE BEST  
FOR CATALOGUE & PRICES  
THEIR MAKE IS EQUAL TO ANY OTHER.  
IF NOT SUPERIOR TO ANY OTHER.  
WE HAVE BEEN IN BUSINESS SINCE 1840.  
**BOARDMAN & SON**  
SILVER PLATED SPOONS  
HADDAM, CONN.

CAN YOU SELL  
A NOISELESS  
NAIL PULLER?

We have one that is combined with Hammer and Setter. To pull small nails from Boot, Shoe, Drug and such light boxes, it has no equal for efficiency. Price \$10 a doz. with a discount besides. It is

**THE COLUMBIA  
NAIL PULLER.**

SPECIALTY MFG. CO.,  
HARTFORD, CONN.

# THE LATEST.



## THE VICTORIA.

We have a full line of above, which is the neatest pattern ever presented to the trade, and it is stamped



NONE GENUINE WITHOUT THIS TRADE-MARK.

**WM. ROGERS MFG. CO.,** Offices, **Hartford, Conn.**  
 FACTORIES HARTFORD, CONN., NORWICH, CONN., AND TAUNTON, MASS.

## Quality or Price?

Don't sacrifice quality for price. Don't pay too much for quality. You do neither by buying of us. The name of a reliable manufacturer on goods is worth more than it costs.



Send for  
folders.

Leader Tea Spoon  
FULL SIZE.

**THE HOLMES & EDWARDS SILVER CO.,** - - Bridgeport, Conn.

**NORTHAMPTON CUTLERY COMPANY,** NORTHAMPTON, MASS.

NEW YORK

SALESROOM,

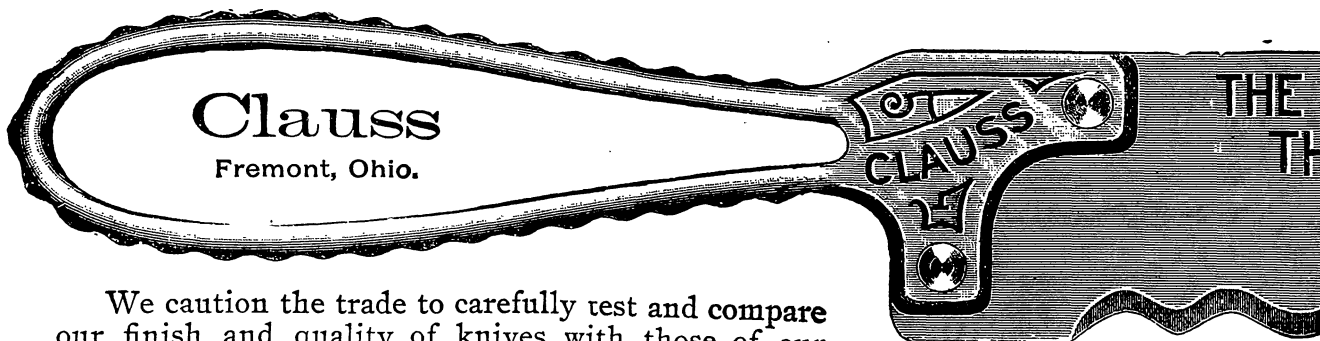


122 Chambers  
Street.

TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

MANUFACTURERS OF

Send for Revised Catalogue.



**Clauss**  
Fremont, Ohio.

We caution the trade to carefully test and compare our finish and quality of knives with those of our competitors; we have no fear of the results as has always, so far, been in our favor.

We take this means of informing our customers that our knives are covered by patents of our own on ideas originally and entirely our own. Infringers will be prosecuted to the full extent of the law.

**THE CLAUSS SHEAR CO., Fremont, Ohio.**

NEW YORK OFFICE, 100 CHAMBERS STREET.



This is a fac-simile of the label on my **VULCAN TOOL CO.** brand of **HATCHETS**; a brand for which I have a regular trade in some sections, but to those who have not "caught on"—dealers who are handling an outside brand—I offer a limited quantity at a very low price. Inquiries for price solicited.

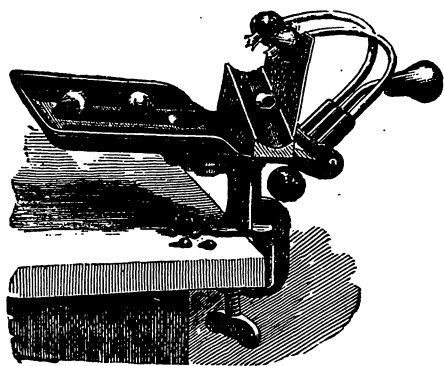
**FAYETTE R. PLUMB, Philadelphia.**





# THE AVERY STAMPING CO.,

CLEVELAND, OHIO.



## The Family Cherry Stoner

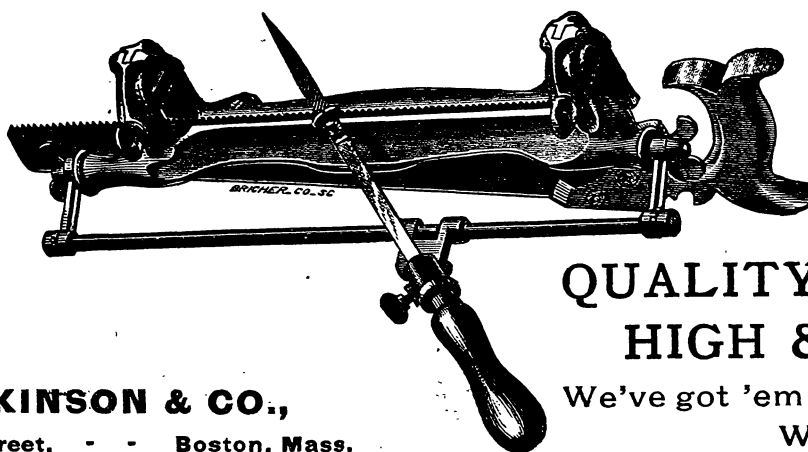
MADE BY

GOODELL COMPANY,

Antrim, N. H.,

Received highest award at World's Columbian Exposition. The only Cherry-Stoner made that does not mash the fruit in removing the stone. No skill required to operate it. Cheaper and better than any other. Send in your orders early. Sold by hardware jobbers everywhere.

## ELKINS' PATENT SAW FILER & CLAMP.



Carpenters say it will hold and file a saw to Perfection.

AT A POPULAR PRICE  
Many of these machines can be sold in your town.

QUALITY & PRICE  
HIGH & LOW.

A. J. WILKINSON & CO.,

182 Washington Street, - - Boston, Mass.

We've got 'em both.

Write us and see.

NEW SEAMLESS TUBE™



## Who Has Not Had Bad Hose ?

Who has not lost time, patience, money, by attempting settlement for such goods ?

THE CAUSE in nine cases out of ten is the lapped seam.

THE REMEDY is in buying our

### PATENT SEAMLESS TUBE HOSE,

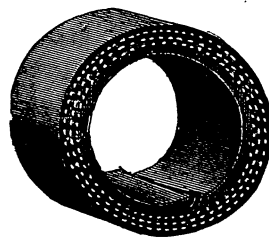
made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers,' Cotton Hose, &c.  
Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

**CLEVELAND RUBBER WORKS**  
of the Mechanical Rubber Co.,  
CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

OLD LAPPED TUBE



We were awarded an order of 25,000 ft. for World's Fair of our celebrated  
**Seamless-Tube**  
COTTON RUBBER-LINED HOSE

We Want Your Trade.  
Send for 60-page Catalogue.  
Write for Prices and Samples.

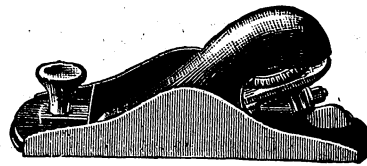
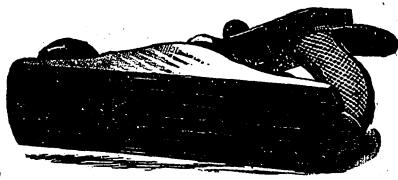
SALES OF  
Over Two Million Feet

#### GARDEN HOSE

alone during the past year, distributed throughout the United States, and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

# CARPENTERS' AND MACHINISTS' TOOLS.

Chaplin's Pat.  
Iron Planes,  
Corrugated  
Bottoms,  
Checkered  
Rubber Handles.



Chaplin's Block  
Planes, Solid  
and Adjustable  
Throats.  
Nickel and  
Japan Finish.

## TOWER'S CHAMPION SCREW DRIVERS.

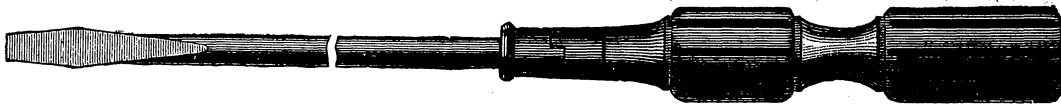
The Fluted  
Handle Gives  
the Best  
Possible Grip.



CHAMPION CABINET SCREW DRIVER.

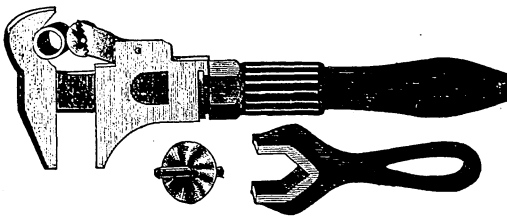


CHAMPION SCREW DRIVER.

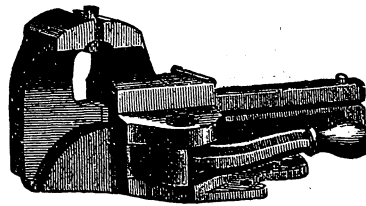


CHAMPION MACHINISTS' SCREW DRIVERS.

ENGINEERS'  
WRENCHES,  
SHORT AND  
LONG NUTS  
AND WITH  
PIPE  
CUTTERS.



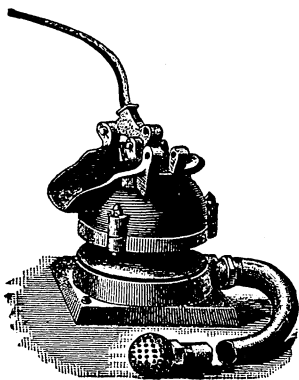
STEPHEN  
VISES,  
STATIONERY  
AND  
SWIVEL  
BASES.



ALSO PLUMB  
BOBS,  
TRAMMEL  
POINTS,  
LEVELS  
OILERS  
WRENCHES, &c

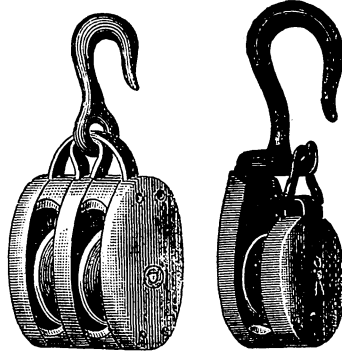
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

## TACKLE BLOCKS, GUN IMPLEMENTS, DOG COLLARS, ICE AND ROLLER SKATES, MALLETS, ETC.



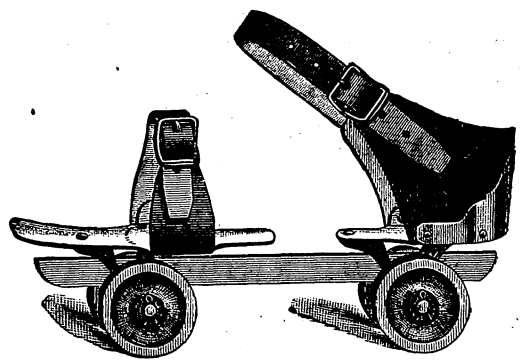
Loud's Patent

SUCTION PUMPS.



Union Brand

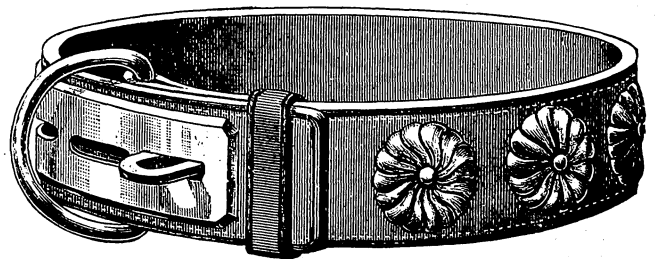
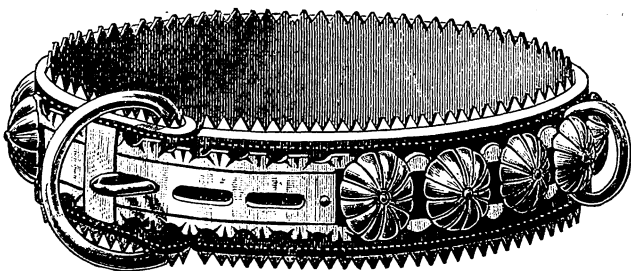
TACKLE BLOCKS.



Side-Walk and Rink

ROLLER SKATES.

A Full Line of Dog Collars, Muzzles, Leads, Etc.



UNION HARDWARE CO., - TORRINGTON, CONN.

New York Office, TOWER & LYON, 95 Chambers St., New York.

# Cooking Made Easy!

—BY THE—

## "New Process" (Evaporating) Stove

### LIGHTS LIKE GAS.

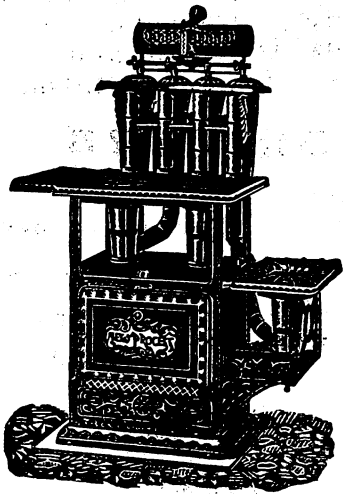
Consumes less gasoline than any other vapor stove made. No waste when not cooking. No heat when not in use. No overheated kitchen.

More than a quarter million in use in the United States.

More than 20,000 enterprising dealers selling them.

Bakes Better and Costs less than any Coal or Wood Range.

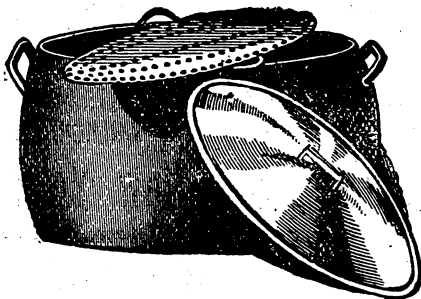
Saves both Time and Money. No Soot, no Dirt, no Ashes.



Send for Illustrated Catalogue, giving full particulars to

**THE STANDARD LIGHTING CO.,**

600-620 Perkins Avenue, Cleveland, Ohio.



### SEASONABLE NEW SEASONABLE

The S. & P.

### ASPARAGUS AND CORN COOKER,

For Corn, Asparagus, Meats, Etc., Etc.

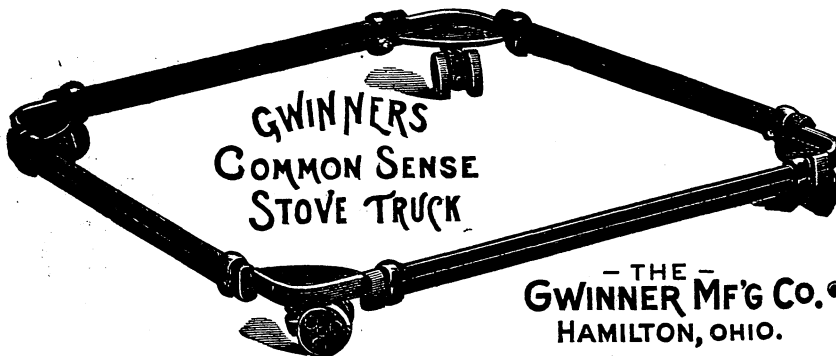
Blue Enamel Finish Outside. Tinned or Enameled Inside. Strainer for Lifting Out. Side Handles.

Three Sizes: No. 1, \$1.40; No. 2, \$1.60 No. 3, \$2.00 each.

TRADE DISCOUNT, 50 PER CENT.

—SEND FOR SAMPLES. CIRCULAR ON APPLICATION.—

**THE STUART & PETERSON CO.,** - - Burlington, N. J., U. S. A.  
SPECIAL GOODS TO ORDER.



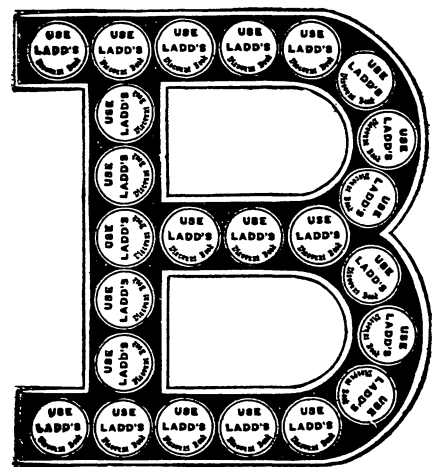
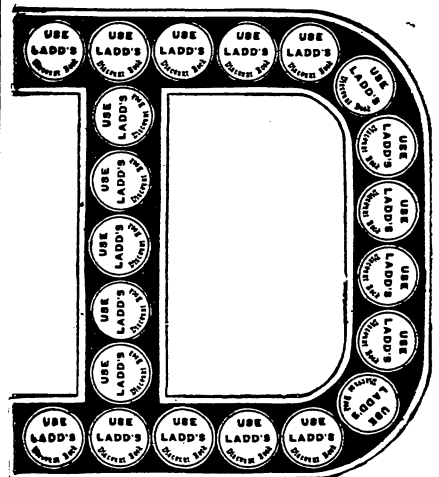
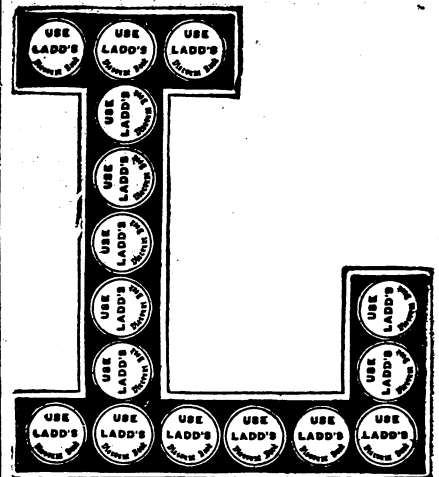
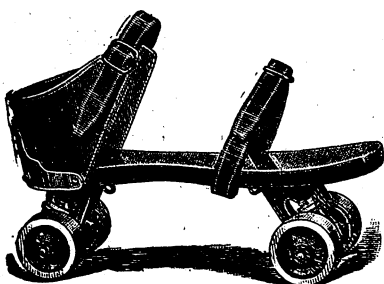
—THE—  
**GWINNER MFG CO.**  
HAMILTON, OHIO.

## HENLEY'S - CELEBRATED Rink AND Club

### Roller Skates.

A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page Catalogue and Prices,

**M. C. HENLEY,**  
**RICHMOND, - - IND.**



ACCURATE.

RAPID,  
CONVENIENT,  
PRACTICAL.

PRICE, THREE DOLLARS.

DOUBLE INDEXED EDITION, \$4.00.

Sent, postpaid, to any address upon receipt of price.

**DAVID WILLIAMS,**

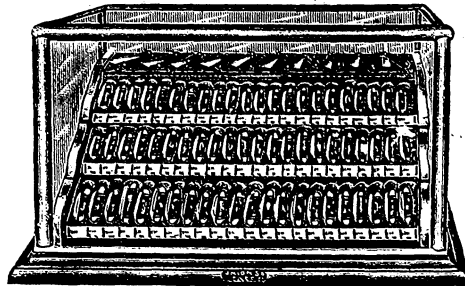
Publisher and Bookseller

96-102 Reade St., New York.

# The "Dempsey" Patent Cutlery Display Case.

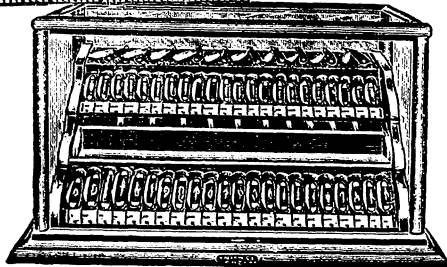
PATENTED OCTOBER 3d. 1893.

UNIVERSALLY indorsed by the trade  
It makes the best display. Increases sales. Attracts attention to particular patterns. Saves time. Economizes space. Easier adjusted and superior in every respect to all others.



Impossible for stock to get in bad shape.  
Made in all lengths and any desired finish.

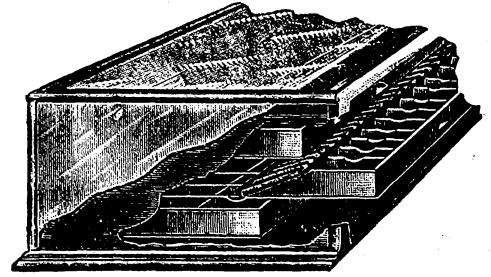
MARKS every article without marring or soiling blades. Prevents rust. Saves money. Is the most convenient and practical manner of keeping stock ever devised. No rubber bands to lift up or soil the cutlery.



Electro shows display tray in position for selecting goods.

We solicit inquiry  
from home and  
foreign trade.

Sole  
Manufacturers,



Electro shows drawers in position to supply or obtain stock.

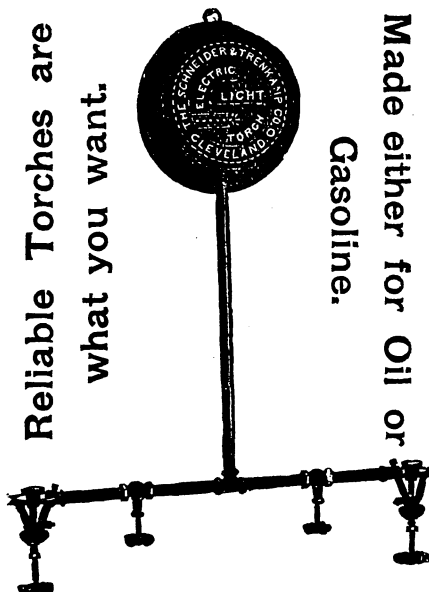
## THE UNION SHOW CASE COMPANY, CHICAGO, ILLINOIS, U. S. A.,

The Following Leading Firms are our Duly Authorized Agents:

Dame, Stoddard, Kendall & Co., Boston, Mass.  
F. A. Koch & Co., New York, N. Y.  
Electric Cutlery Co., New York, N. Y.  
A. R. Justice & Co., Philadelphia, Pa.  
Henry Keldell & Co., Baltimore, Md.  
The Wm. Bingham Co., Cleveland, Ohio.

Speer Hardware Co., Fort Smith, Ark.  
Dixon, Bergeson & Co., Portland, Oregon.  
Baker & Hamilton Hardware Co., San Francisco, Cal.  
Kirkpatrick Hardware Co., Atlanta, Ga.  
W. C. Belknap & Co., Louisville, Ky.  
A. F. Shapleigh Hdw. Co., St. Louis, Mo.  
The Wyeth Hardware & Mfg. Co., St. Joseph, Mo.

Rogers & Baldwin Hdw. Co., Springfield, Mo.  
McGregor-Noe Hdw. Co., Springfield, Mo.  
Wells & Nellegar Co., Chicago, Ill.  
Henry Sears & Co., Chicago, Ill.  
Joseph Fritzlaft Hdw. Co., Milwaukee, Wis.  
Farwell, Ozmun, Kirk & Co., St. Paul, Minn.



Reliable Torches are  
what you want.

Made either for Oil or  
Gasoline.

These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.  
Write us for prices. A liberal discount given to the trade.  
Manufactured by  
**THE SCHNEIDER & TRENKAMP CO.,**  
Nos. 479 to 497 Case Ave., Cleveland, Ohio.

## Yacht AND Boat Hardware.

**L. W. FERDINAND & CO.,**  
BOSTON, MASS.

Send for 226-Page Catalogue.

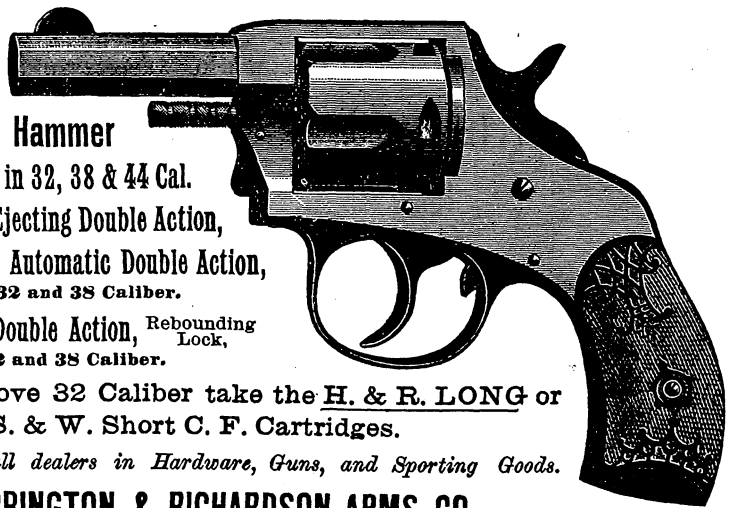
OUR  
AMERICAN  
And Safety Hammer  
Double Action in 32, 38 & 44 Cal.  
H. & R. Imp. Ejecting Double Action,  
H. & R. Imp. Automatic Double Action,  
In 32 and 38 Caliber.  
And Premier Double Action, Rebounding  
Lock,  
In 32 and 38 Caliber.

All the above 32 Caliber take the **H. & R. LONG** or  
S. & W. Short C. F. Cartridges.

For Sale by all dealers in Hardware, Guns, and Sporting Goods.

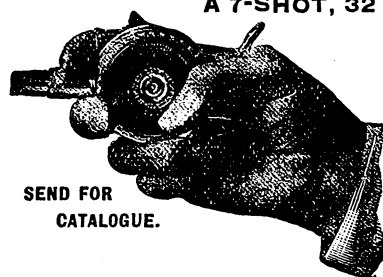
**HARRINGTON & RICHARDSON ARMS CO.,**

**Worcester, Mass., U. S. A.**



## THE NEW "PROTECTOR" REVOLVER

A 7-SHOT, 32 CALIBRE, STANDARD CARTRIDGES.



SEND FOR  
CATALOGUE.

QUICK! DURABLE!  
COMPACT! EFFECTIVE!

The most Genteel and Serviceable Rapid Firing Revolver ever manufactured. Carried in the vest pocket as easily as a watch. Absolutely Safe! Automatic Safety Lock! An Ideal Weapon for a man to carry. Selling by the Thousand. Elegantly Finished, Neatly Packed in a Box, Price \$6.00. Ask your Dealer for them or send to us.

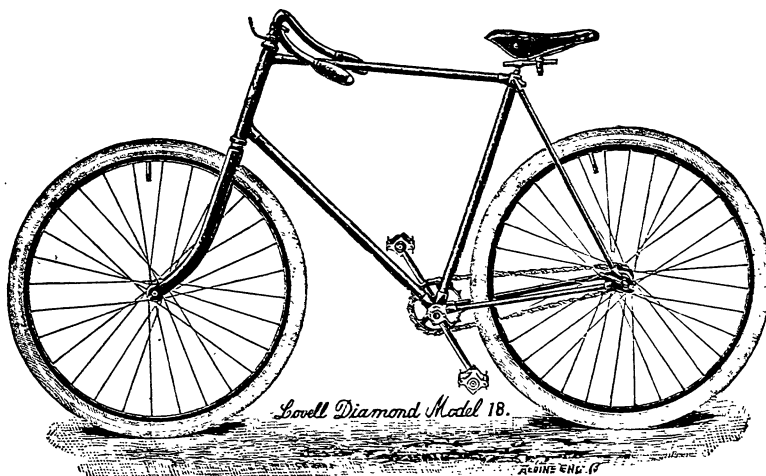
**CHICAGO FIRE ARMS CO., 637-638 Monadnock Building, CHICAGO, ILL.**

# Lovell Diamond Bicycles

ARE THE UNIVERSAL FAVORITES.  
BEST WHEELS IN THE WORLD.

Lightest, Strongest, Most Durable.  
Are Perfect in Construction.

They Are Built to Suit the Riders,  
and have stood the hardest use of any wheel made.  
Have a wheel that you can place confidence in.



**Ride the Best.**  
**Always in the Lead.**  
**WARRANTED IN EVERY RESPECT.**

SEND FOR ILLUSTRATED BICYCLE CATALOGUE.

## John P. Lovell Arms Co.,

Dealers in Bicycles, Tricycles, Velocipedes, Guns, Rifles, Cutlery, Fishing  
Tackle and Sporting Goods of Every Description,

147 Washington Street—BOSTON—131 Broad Street.

# NO MORE DULL RAZORS! ZEOLITHE

Puts the keenest edge on the dullest razor. It has been thoroughly tested and its

**Merits are Absolutely Guaranteed.**

It is put up in an attractive manner and sells on sight. Send for samples and prices to the Sole Selling Agents,

**Dame, Stoddard & Kendall,**

374 Washington St., Boston, Mass.

## THE SAMUEL WINSLOW SKATE MFG. CO.,

Worcester,



Mass., U. S. A.

**The most extensive Skate Factory in the World.**

## LONG REACH ICE SKATES. Complete Line of Ice Skates, From the Cheapest to the Finest.

MANUFACTURED BY  
KEENE MFG. CO., KEENE, N. H.



**BIGELOW & DOWSE CO., General Agents,**  
229 FRANKLIN STREET, - - BOSTON, MASS.  
SEND FOR 1894 CATALOGUE.

—AGENTS—

The McIntosh-Huntington Co., Cleveland, Ohio.

Jay A. Rickard, Schenectady, N. Y.  
Smith, Lyon & Field, New York, N. Y.  
Standart Bros., Detroit, Mich.  
Supplee Hardware Co., Philadelphia, Pa.  
The Henry Sears Co., Chicago, Ill.  
Weed & Co., Buffalo, N. Y.

## The Art of Selling

By F. B. GODDARD.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse and tells how he masters men. But beyond this, the work embraces much information which will be instructive and useful to all classes of business men, discusses fully the characteristic methods of conducting business to-day and makes an interesting application of character reading to the work of business negotiations

**Price, 50 Cents.**

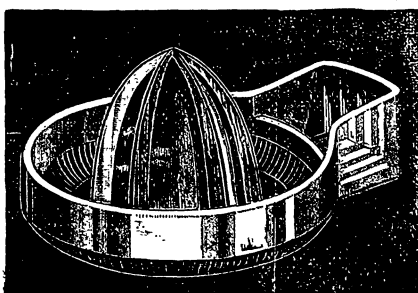
SENT PREPAID ON RECEIPT OF PRICE BY

**DAVID WILLIAMS, Publisher & Bookseller**

96-109 Rensselaer St., New York.

## PURE ALUMINUM LEMON JUICE EXTRACTOR

TRADE MARKS: { "Sterling Aluminum."  
"Monitor."



Patented December 15, 1891.

**STERLING ALUMINUM CO.,**  
1195 FULTON STREET, - - - BROOKLYN, N. Y.

### THE MONITOR

IS THE LATEST novel article of utility in the market. It combines features not before in use for the same purpose. It has a large reservoir to hold the juice, and an ample spout and strainer. It is not necessary to catch the liquid in a cup as it flows and can be used anywhere. Being made of **Pure Aluminum**, which fruit acids do not affect, it is the cleanest. Also made in flint glass and carefully packed for Hardware trade.

MANUFACTURED ONLY BY



## THE BEST JUVENILE BICYCLES

At a Lower Price than Poor Machines can be Bought.

**FALCON JUNIOR** for boys. 24 in., weldless tube, all steel, 1½ in. Whippet pneumatic tire.

**FALCON JUNIOR COMBINATION** for boys and girls. 24 in., weldless tube, all steel, 1½ in. Morgan & Wright pneumatic tire.

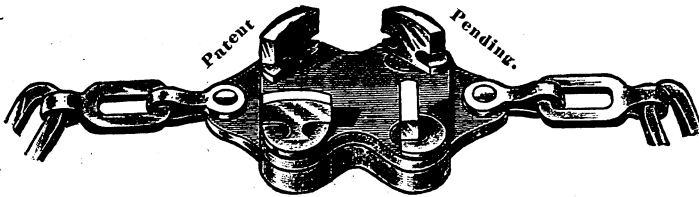
We have closed out all our other styles and these are going. There is nothing like them at any price and no other price as low.

**THE W. BINGHAM COMPANY,**  
CLEVELAND, OHIO.

### THE GOODHUE COMBINATION LOCK.

A KEYLESS LOCK FOR CYCLISTS, TRAVELING MEN, ETC.  
EASILY OPERATED IN THE DARK.

Strong.  
Highly  
Finished.



No  
Two  
Alike.

Special Design made for "Lockers."

List, \$1.00. Good Discount to Dealers. Manufactured and sold by  
**THE INDEPENDENT ELECTRIC CO.,** - - - 39th St. and Stewart Ave., Chicago.  
PARKHURST & WILKINSON, General Western Agents.

**THE CRAWFORD MFG. CO.**

MAKERS OF

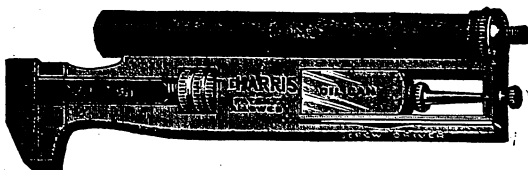
HIGH GRADE AND JUVENILE

**BICYCLES,**

FACTORY, HAGERSTOWN, MD.

NEW YORK OFFICE, 72 READE STREET. L. B. Whympers, Mgr.

## HARRIS COMBINATION WRENCH.



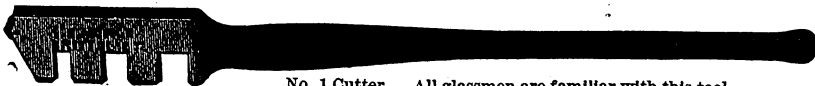
Wrench, Oil Can, Screw  
Driver and Pump all  
combined in one.

Made of drop forged steel, case  
hardened; weight, 10 ounces or 3  
ounces less than all the other tools  
separate.

Electrotypes on Application. Send for Descriptive Circular.

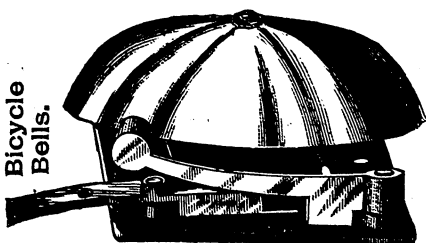
**HARRIS MANUFACTURING CO.,** - 381 Main St., Buffalo, N. Y.

**MONCE'S NOVELTY GLASS CUTTERS.** - INTERCHANGEABLE LOCK STENCILS.



No. 1 Cutter. All glassmen are familiar with this tool.

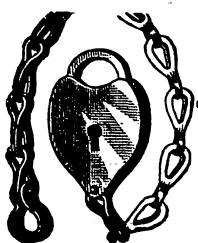
**S. G. MONCE, BRISTOL, CONN.**



Bicycle  
Bells.

**BEVIN BROS. MFG. CO.,** Easthampton, Conn.,  
Manufacturers of

Sleigh Bells, House, Tea, Hand, Gong Bells, &c



**Bicycle Locks.  
Bicycle Bells.**

Especially Low Prices.

We manufacture  
hardware specialties  
of all descriptions to  
order.

**HAINES & ZIMMERMANN,** 407 Cherry St., Phila.



DO YOU AIM

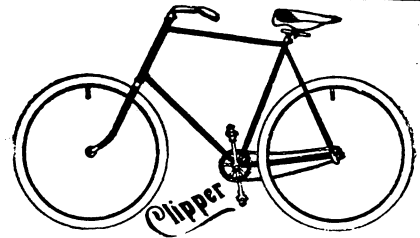
### To Make a Bull's Eye

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a  
Rifle, Pistol or Shot Gun, you will make a HIT by  
sending for the IDEAL HAND BOOK.

**IDEAL MFG. CO.,** New Haven, Ct., U. S. A.

Please mention *The Iron Age* when you write.



### Clipper Bicycles

are built to please the dealer and  
rider.

Are you in the bicycle business?  
If not, you can make it pay to han-  
dle Clippers. Buy direct from the  
manufacturer and save the job-  
bers' profit. It will add consider-  
able to your bank account. We  
want responsible dealers only.  
We may be able to interest you, in  
fact we are sure of it. Our policy  
is a protective one, and will please  
you. It protects against Scalpers  
and "Curb Stone Brokers."

**Grand Rapids Cycle Co.,**

Grand Rapids, Mich.

### Every Year

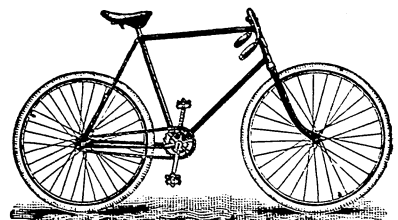
the "STERLING" becomes more popu-  
lar with dealers. They find it gives bet-  
ter satisfaction than any other wheel.  
No worry over repairs.

**THE STERLING**  
(Built like a Watch.)

A wonderful, strong, light wheel, with  
a dozen points of superiority over all  
others. Our "new departure" cata-  
logue (free) tells all about it.

**STERLING CYCLE WORKS,**  
234 Carroll Ave., CHICAGO.

## Remington Cycles.



In Design, Workmanship, Material and  
Finish they are BEST.  
SEND FOR CATALOGUE.

**Remington Arms Company**

313-315 Broadway, New York.

**Pocket Companion.** Containing useful information  
and tables appertaining to the use of wrought iron  
and steel as manufactured by Carnegie, Phipps &  
Co., Ltd., Pittsburgh, Pa. For engineers, archi-  
tects and builders. 1892 edition. Edited by C.  
L. STROBEL, C.E., assisted by F. H. KINDL, C.E.  
Leather with flap, 334 pages..... \$2.00

For Sale by **DAVID WILLIAMS,** 96-102 Reade St., N.Y.

For Sale by  
the  
Hardware Trade.

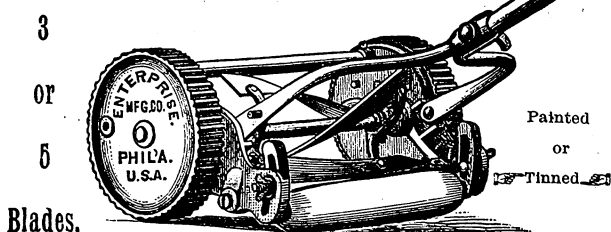
The Enterprise Mfg. Co. of Pa.,

THIRD and DAUPHIN STS., PHILADELPHIA, PA.

Send for  
Catalogue.  
Free.

## ENTERPRISE LAWN MOWERS,

7, 9, 11, 13, 15 INCHES.

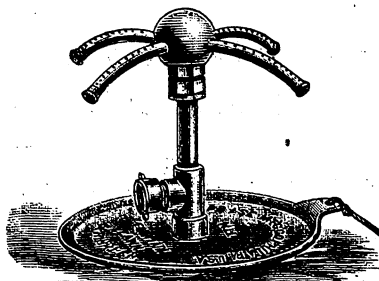


Blades.

Equal to the best in the market.  
Prices quoted on application.

## ENTERPRISE Lawn Sprinklers.

Finished  
in a  
Superior  
Manner.



Muddy  
Water  
does not  
Interfere  
with it.

No well kept Lawn complete  
without one.

# Low Prices and High Quality.

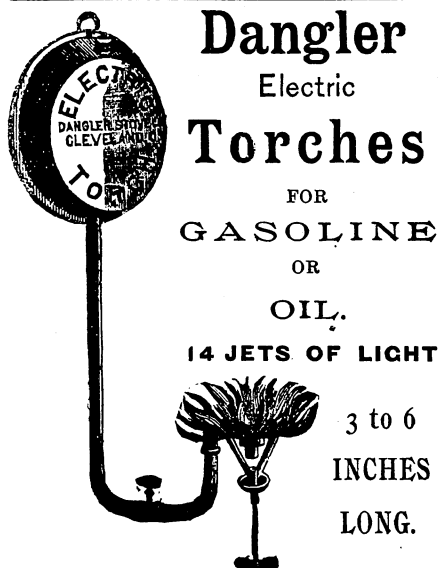
Our styles of Corn Poppers  
are guaranteed to be all of  
the latest and best.

Write to know what  
our quantity discounts  
are.



Dealers everywhere are entitled to New Catalogue and New Prices.

**Bromwell Brush & Wire Goods Co.,** - - Cincinnati, O.  
ESTABLISHED 76 YEARS.



FOR lighting manufacturing establish-  
ments, such as Rolling Mills, Found-  
ries, Machine Shops, Engine Rooms,  
&c., &c., with a convenient, portable,  
brilliant, steady light, and by cheaper  
means than by Coal Gas.

SOLE MANUFACTURERS,

**The Dangler Stove & Mfg. Co.,**  
Cleveland, Ohio.

## MENDING CONE



For mending Tin, Copper, Sheet  
Iron and Agateware without solder  
or acid. A child can use it. Best selling  
article invented. Big inducements to  
agents. One box will mend 125 holes.  
Sample box by mail 25 cents.

Address, P. D. MURPHY, LOCKPORT, N. Y.

THE CHAS. **PARKER CO.** MERIDEN  
MANUFACTURERS OF  
THE PARKER GUN VISES THE PARKER LAMP  
WOOD SCREWS COFFEE MILLS,  
CABINET-LOCKS SPOONS &c.



This illustration represents our Columbia One-Pound Mill No. 260.

The Handsomest and Best Mill of this Character in the Market.

We have over sixty other styles and sizes. Catalogues furnished dealers.

Some people try to imitate others. I once knew a man to try to vault a mule from its rear end as its owner had just done. His attempt was a failure and they sent him home on a stretcher. The sympathy of the onlookers was for the mule. —Puddinhead's son Will.

**W**E ARE the originators of a combined Show Case and Money Drawer for which we have applied for patent, and our attorneys assure us that our invention is novel and that we will be allowed clear and broad claims and a valid patent.

We therefore CAUTION all persons to not buy or sell said Combined Show Case and Money Drawer excepting those bearing our name plate. We will prosecute all offenders for infringement and damages soon as our patent is allowed, and thus resent the outrageous attack on our business.

## WADDEL WOODEN WARE WORKS,

Wholesale Manufacturers of Show Cases, Money Drawers, Coffee Mills, &c.,

— GREENFIELD, OHIO. —

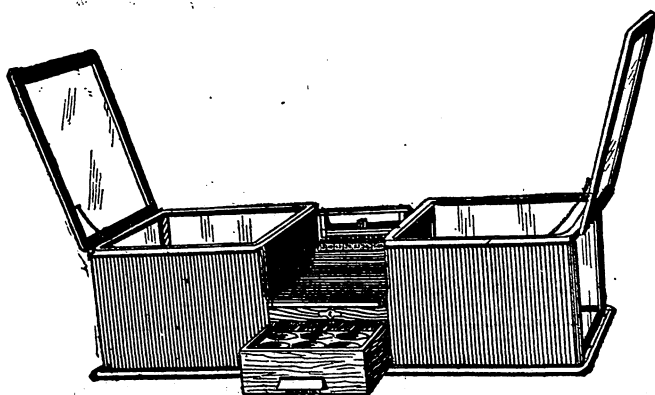
# Sift It Down Fine.



And where can you find a sifter that excels in any particular "The Hunter?" We will not even except price. If you want the best, and who does not? and that promptly, we can furnish them. We are now able to turn out over 4,000 daily. If others are so much superior, why don't they sell? Write for prices.

**The FRED. J. MEYERS MFG. CO.,**  
HAMILTON, O.

F. J. MATTISON, Eastern Agent,  
69 Beekman St., NEW YORK.



Combined Cash Register and Showcase Cash Drawer with Combination Lock.

PRICE \$25.00, F. O. B. FACTORY.

Combination Lock on Cash Drawer susceptible of 33 changes; can be set to a different combination in an instant. Automatic Lock on lid of Showcases that is operated by opening or closing Cash Drawer. Case cannot be opened from outside and can only be opened by knowing combination. Alarm Bell is sounded every time drawer is opened.

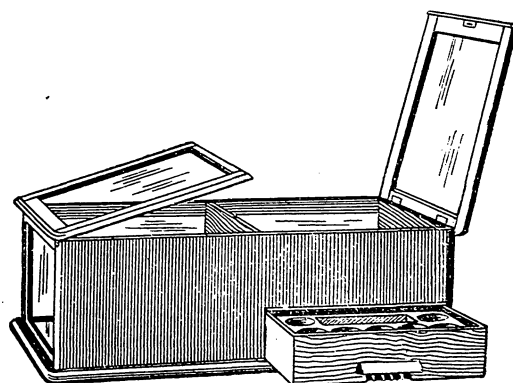
CASH REGISTER KEEPS RECORD OF ALL SALES AND ADDS IN DETAIL THE FULL AMOUNT.

### HUSTLING DEALERS CAN SELL HUNDREDS OF THEM.

The demand is greater than the supply. Hard times cut no figure. Be quick if you want the cream of the trade.

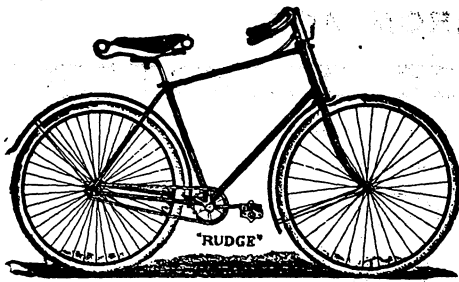
**THE SUN MANUFACTURING CO.,**  
Greenfield, Ohio,

MANUFACTURERS OF  
Cash Registers, Money Drawers, Showcases, Coffee Mills, Specialties and Novelties.



Combined Showcase and Cash Drawer Combination Lock.

PRICE \$12.00, F. O. B. FACTORY.



**HARDWARE DEALERS AND RUDGE CYCLES.**  
Agents wanted immediately for unoccupied territory. Write  
for illustrated catalogue and Price-list of 1894 Wheels.

**The Bronson Supply Co.,**

Sole Agents for the United States.

72 Beekman St., New York.

**Electric Motor Construction for Amateurs.**

By C. D. PARKHURST.

Gives directions and working drawings for making an electric motor to run sewing machines, small lathes, etc., with rules for constructing the battery to furnish the electrical current, and much practical relative information.

A table indicating the difference in wire gauges is included.

Price, \$1.00.

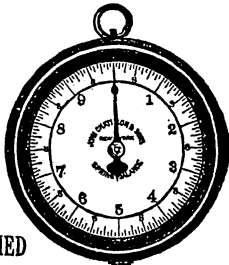
Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller

96-102 Reade Street, New York.

**John Chatillon & Sons,**

85, 87, 89, 91, 93 CLIFF ST, NEW YORK.



ESTABLISHED

1835.

SEND FOR  
PRICE-LIST.

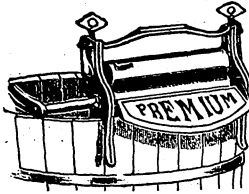


Sole Agents for

Foster Bros.' Butchers' Cutlery.



John Chatillon & Sons, N. Y.



**COLBY WRINGER CO., - Montpelier, Vt.**

MANUFACTURERS OF THE

**Premium Wringer,**

With Automatic Apron Adjustment.

SURPLESS, DUNN & ALDER, Direct Representatives,

15 Murray Street, New York.



No. 3

Globe Street Lamp.

**Light your Streets and Driveways.**

The S. G. & L. CO.

**Tubular Globe  
Street Lamp**

IS THE Best Street Lamp Manufactured.

Equal to the best Gas Light.

Will not Blow Out in the Strongest Wind.

Will not Smoke.

Will not Freeze.

Automatic Extinguisher.

Outside Wick Regulator.

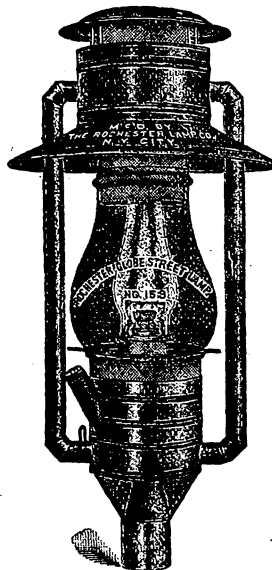
Will Burn Four Hours for One Cent.

MANUFACTURED BY

**STEAM GAUGE AND LANTERN CO.,**

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.



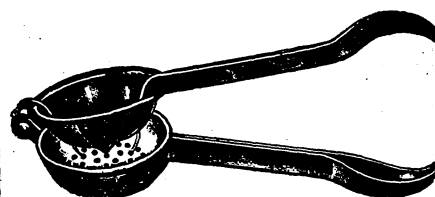
**The Rochester Globe Tubular  
- - Station and Street Lamp.**

It's a long name, but it tells a good deal. It tells you of a new Street Lamp with "The Rochester" Central Draft Burner. A central draft burner (round flame) gives three times the light of an old style flat-wick burner. The first and only Tubular Globe Central Draft Lamp ever made! Storms, rain, snow, sleet or hail do not affect it. Burns all night. Made with either bail or post socket, with 26 inch enamel reflector if wanted, for railroad and other uses. Takes regular No. 3 or 9 street lamp globe, to be had everywhere. For Railroad Stations, Ware-rooms, Mills, Docks, &c., it is the best lamp ever made. Price, \$6.00; send for trade discount.

MANUFACTURED ONLY BY

**THE ROCHESTER LAMP CO.,**

42 PARK PLACE, }  
37 BARCLAY ST., } NEW YORK.



**Do you make Lemonade?**

If so you want our Squeezer. Positively the best. Suitable for any size Lemon. Write for catalogue and prices.

BERGER BROS., 237 Arch St., Philadelphia, Pa.

**BOOKS.**

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York

# IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

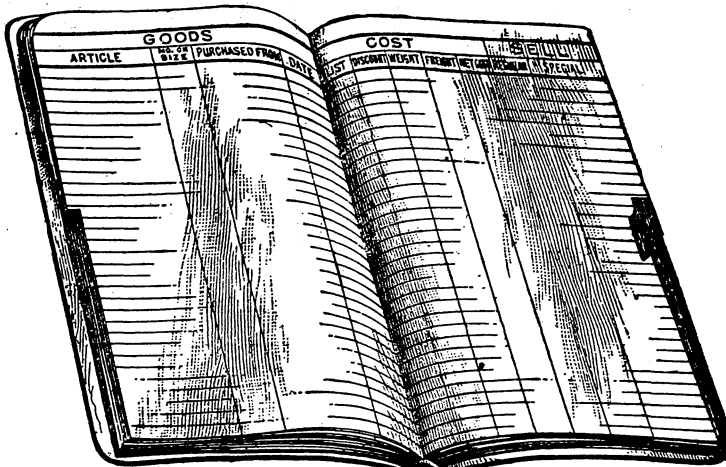
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

#### FOUR EDITIONS:

A, 200 pages,	\$1.00
A F, 200 pages with flap,	1.25
A 2, 400 pages,	1.50
A F 2, 400 pages with flap,	1.75



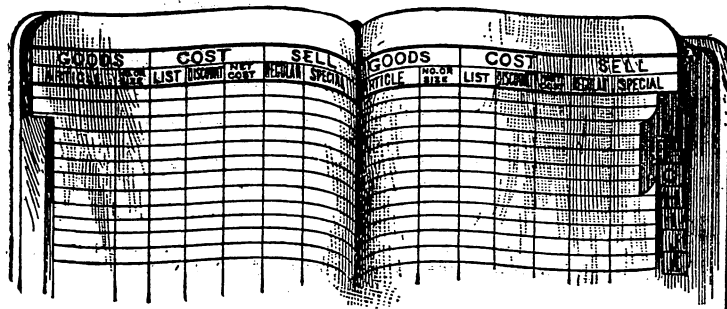
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

#### FOUR EDITIONS:

B, 200 pages	\$1.00
B F, 200 pages with flap,	1.25
B 2, 400 pages,	1.50
B F 2, 400 pages with flap,	1.75



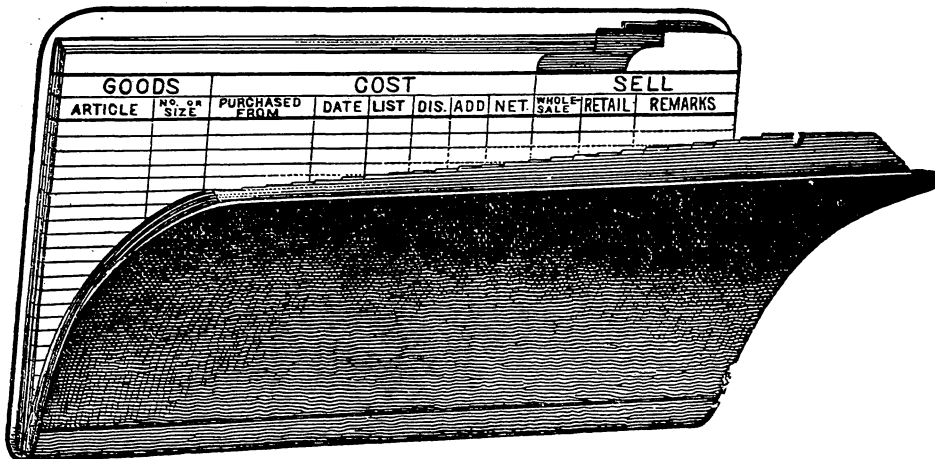
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

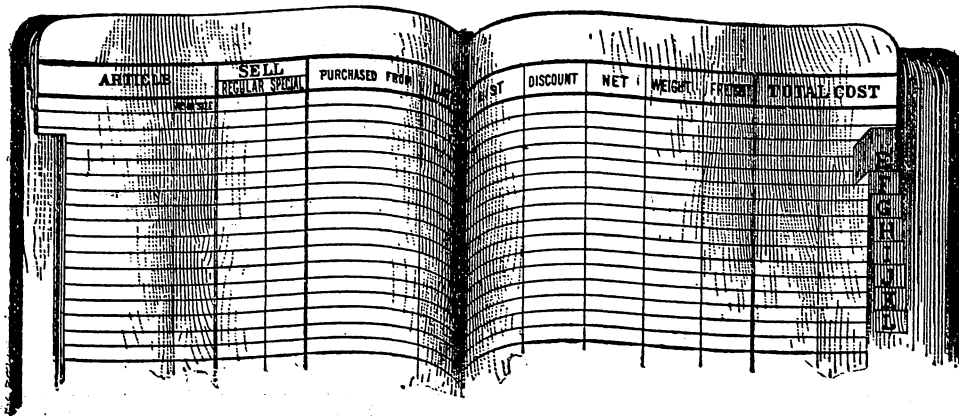
Size, 4½ x 7½ in.; grain seal leather.

#### FOUR EDITIONS:

C, 200 pages,	\$1.00
C F, 200 pages with flap,	1.25
C 2, 400 pages,	1.50
C F 2, 400 pages with flap,	1.75



Hardware Price Book C.



Hardware Price Book D.

arrangement is adapted to the requirements of the trade in this direction. Size 5¼ x 8 in.; grain seal leather.

FOUR EDITIONS.	D, 200 pages,	\$2.00	D 2, 400 pages,	\$3.00
	D F, 200 pages, with flap,	2.50	D F 2, 400 pages, with flap,	3.50

Sent, post-paid, on receipt of price by **DAVID WILLIAMS, Publisher, 96-102 Reade St., New York**

Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This arrangement is adapted to the requirements of the trade in this direction.

# N. R. STREETER & CO.,

Manufacturers of **SAD IRONS AND HARDWARE.**

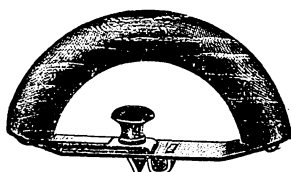
Our catalogue for 1894 having recently been issued, we beg to direct the attention of our patrons to our increased line of standard goods and patented specialties of our exclusive manufacture.

Our improved facilities enable us to maintain a standard of workmanship and quality second to none.

**Factories,**  
ROCHESTER, N. Y.  
POTTSTOWN, PA.

**General Office,**  
GROTON, N. Y.

**New York Office,**  
W. H. JACOBUS,  
90 CHAMBERS ST.

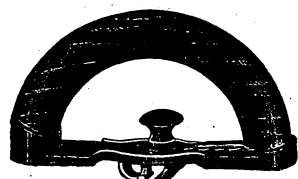


PATENT APPLIED FOR.  
The Steel Stretcher Handle,  
for Mrs. Potts' Sad Irons,  
in Hazel Wood only.  
No. 110.

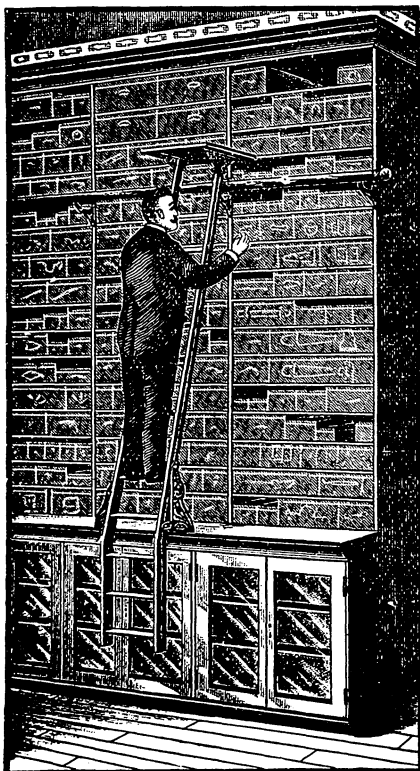
**The Cleveland Wood Turning Co.,**  
710-726 Scranton Ave., Cleveland, O.

Special work in Handles and Wood Turning of all kinds. Our line of regular made Tool Handles is the best.

**New York Office:**  
W. H. JACOBUS, Agent,  
No. 90 Chambers St.



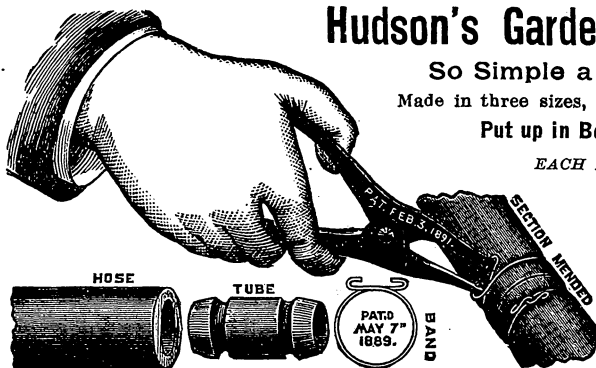
Walnut, Japanned, No. 1.  
Walnut, Tinned, No. 2.  
Hazel, Japanned, No. 10.  
Hazel, Tinned, No. 20.



## THE BICYCLE STEP LADDER.

Highest Award, Columbian Exposition.  
The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made.  
Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit. Send for illustrated catalogue and prices. See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street, Chicago, Ills.



## Hudson's Garden Hose Mender

So Simple a Child Can Use It.

Made in three sizes, for  $\frac{1}{2}$  in.,  $\frac{3}{4}$  in. and 1 in. hose.  
Put up in Boxes for Family use.

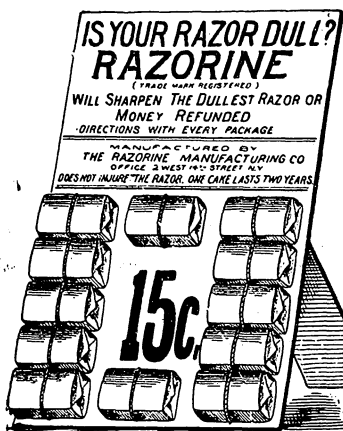
EACH BOX CONTAINS:

1 Pair Pliers,  
20 Bands,  
6 Tubes.

Sells readily at 75 cents.  
Liberal discount to Dealers.

Send for Full Description.

**C. E. HUDSON & CO.,** Manufacturers, Leominster, Mass.



## RAZORINE

(Trade-Mark Registered.)

Will sharpen any razor without injury—every man who shaves requires it.

### SPECIAL OFFER:

We guarantee "Razortine" if given proper window display to be positively the **BEST** selling article at the price in the hardware trade. Let us mail you a card. You need not pay for it until you sell it. Very liberal margin.

**RAZORINE MFG. CO.** 2 West 14th St. N. Y. City.

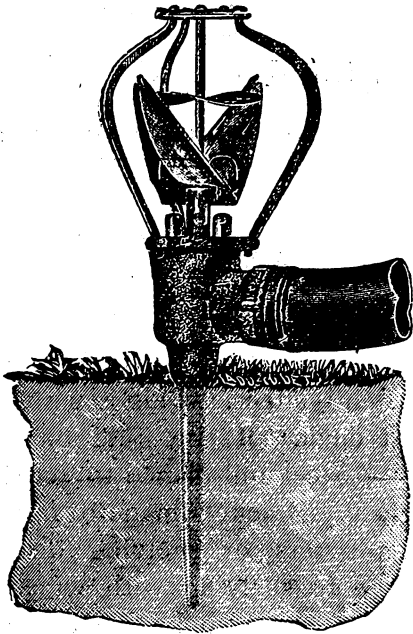
**BOOKS.** YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS, Publisher** and bookseller, 96-102 Reade St., New York



**The Best Lawn Sprinkler Ever Made at Any Price.**

Imitation is the sincerest flattery. They copy our ideas, but they don't get there with the kind of Sprinkler the people want.

*This Sprinkler will throw Water in a complete Circle or Half Circle as desired.*



Patented October 20, 1891.

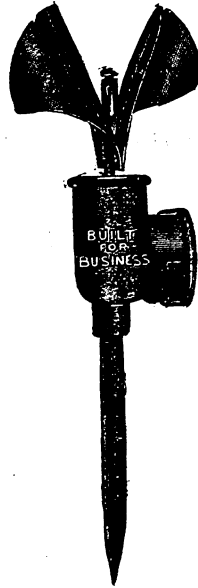
## Bonnette's Arc Lawn Sprinkler.

We claim this is the only perfect Sprinkler in existence. It is simple, will not wear out nor clog up. Its full flow always, whether on the whole or half circle, prevents the straining or bursting of the hose. This is not true of any other sprinkler made. It is well made and handsomely nickeled, is boxed singly with full directions how to use it. Its merits are, without question pre-eminently superior to any other.

**The Best Low Priced Sprinkler in America.**

## "The HUSTLER" LAWN SPRINKLER.

BUILT FOR BUSINESS.



We down all competition,  
And admire mere opposition,  
Yet under no condition,  
Will we budge from our position,

THAT THIS IS

The Most Practical,  
The Most Sensible

AND THEREFORE

The Most Serviceable

Bonnette's Patent.

Lawn Sprinkler ever put upon the market at a Popular Price.

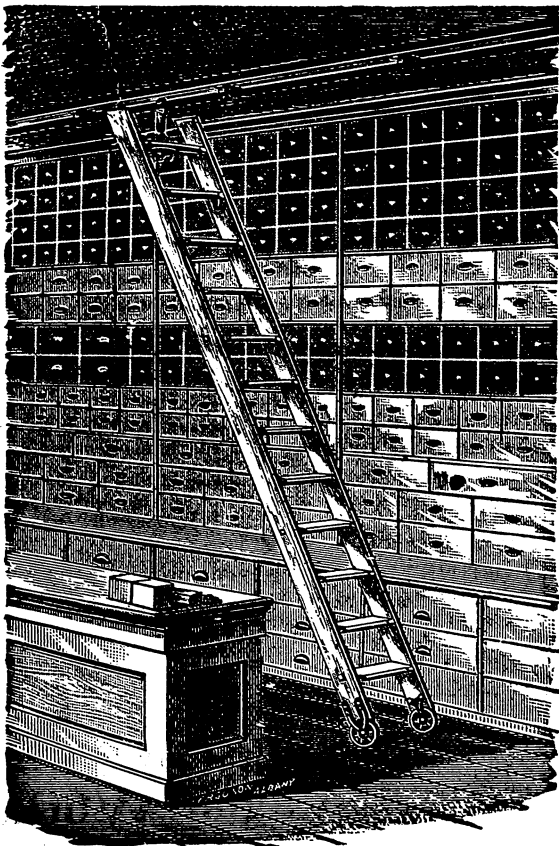
PLEASE SEND IN YOUR ORDERS TO

**JOHN H. GRAHAM & CO., General Agents,** 113 Chambers St., New York City.

BONNETTE ARC LAWN SPRINKLER CO., Bay City, Mich.

GIBBS MANUFACTURING CO., Canton, Ohio.

## THE "NOISELESS" STORE LADDER.



The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

**M. CROISSANT,**

**ALBANY, N. Y.**



## Law without Lawyers.

A Compendium of Business  
and Domestic Law for  
Popular Use.

By H. B. COREY,  
Member of the New York Bar,

PRICE, \$1.00. Post-paid.

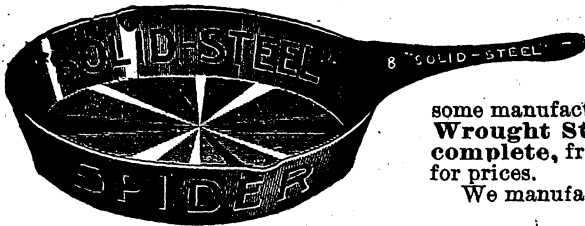
A simple, clear and accurate presentation of the general laws, and of the laws of the several States relating to the rights of property, contracts, debts, partnerships, bankruptcy, insurance, corporations, marriage, divorce, &c., &c., with which are included correct copies of all legal instruments and forms, such as notes, deeds, mortgages, leases, wills, &c., and a dictionary of legal words and phrases.

Sent, post-paid, on receipt of price, by

**DAVID WILLIAMS,**

Publisher and Bookseller,

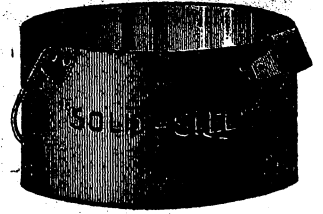
96 - 102 Reade St., New York.

**"SOLID-STEEL" SEAMLESS HOLLOW WARE.**

No Seams, no Rivets in "Solid-Steel" Ware.

**Brilliant Finish.**

Notwithstanding the claims made by some manufacturers' agents our spiders are made from **Wrought Steel, Without Seams or Rivets,** complete, from a single piece of metal. Write for prices.  
We manufacture our own goods.

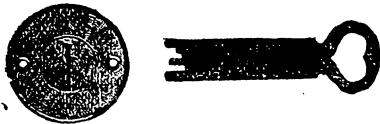
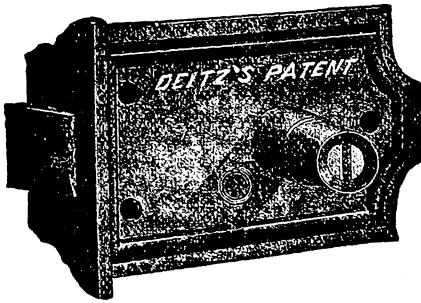


"Solid-Steel" Maslin Kettle.

**The Cleveland Stamping & Tool Co., Cleveland, O.**

**We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.**

**A. E. DEITZ**



No. 109 Latch.

**J. C. McCARTY & CO., Agents,**  
97 Chambers and 81 Reade Sts., New York.

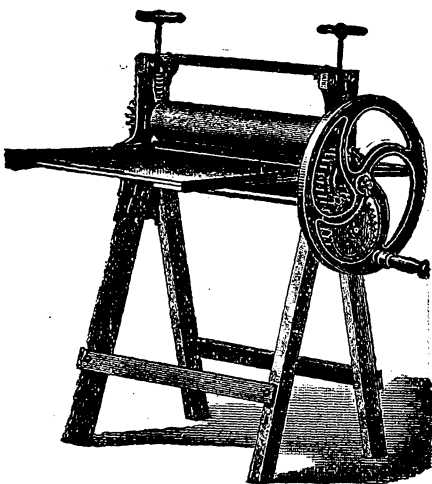
Factory, **BROOKLYN, E. D., N. Y.**

**The Family Mangle.**

**WARRANTED TO DO**  
**Better Work than Hand-Work**

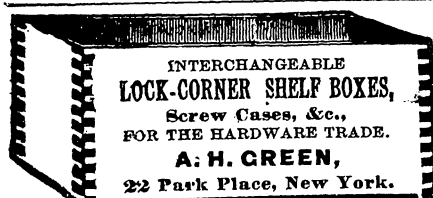
**SAVES** all the fuel,  
two-thirds the work.  
Keeps the linen whiter.

**We Guarantee Every Machine.**



Send for descriptive circular to

**S. C. Johnson, Racine, Wis.**  
**Agents Wanted.**

**An Investment**

That soon pays for itself, and a fixture you will wonder how you have got along without. Hundreds of recommendations to this effect. This is without doubt the best device of the kind on the market to-day. Steel rail planed to get the smoothest surface. Brackets made to fasten to standards, pilasters, or shelving direct. Can be adjusted to shelving with wide or narrow ledge, and can also be fitted where there is no ledge and can be used on circular rail as well.



**WORLD'S FAIR AWARD.**

A postal card will get our Catalogue.

**Morley Brothers,**

123 N. Washington Ave., Saginaw, Mich.

**The Utility Washboard**

Is a Zinc Board made from best quality No. 6 Zinc, the heaviest and strongest Zinc in use for Washboards.

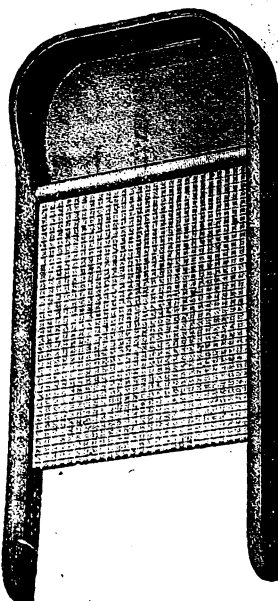
**CRIMP**—The Crimp is our Improved Deep Globe acknowledged far superior to any now in use on other boards.

**OFFERS**—absolute protection from water at sides as well as the top of the soap board.

**WHY?**—Because being made of one piece, which is bent thin and broad at the sides and top of soap board where all splashing occurs, it is impossible in washing to splash over it.

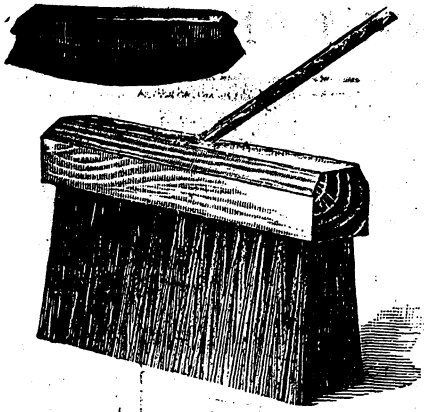
**CONSTRUCTION**—The Board in point of construction excels anything of its kind ever produced. Its lines present a symmetry and regularity pleasing to the eye, and in point of strength is unquestionably superior to any.

**SALES**—Where these are offered for sale competing boards are not "in it."



MANUFACTURED BY

**Olds Wagon Works,**  
Fort Wayne, Ind., U. S. A.



## Joseph Lay & Co.,

RIDGEVILLE, - IND.  
MANUFACTURERS OF  
**Steel Wire Brooms,**  
CASTING,

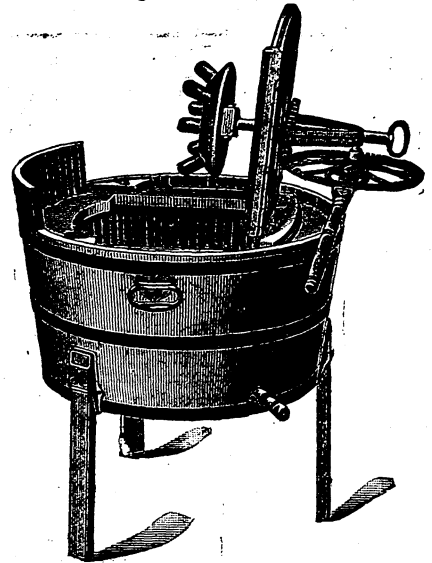
Butcher Block, Flue, and all  
kinds Wire Brushes.

### MOULDERS' BRISTLE BRUSHES.

Heavy and Light Shop Brooms, Push  
Brooms of every kind. Street  
Sweeper Rolls refilled.

CORRESPONDENCE SOLICITED.

## The Corrugated Round Washer.



Our Special Construction, Superior Work-  
manship, Beauty of Finish, and recent  
Patented Improvements,

Cause thinking dealers to investigate this  
washer, with but one verdict—

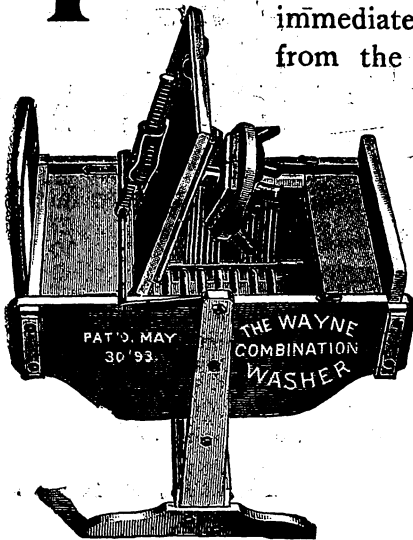
**IT IS PERFECTION.**

Write for bottom prices.

DIETHER & BARROWS, Fort Wayne, Ind.

# You Needn't Look

immediately for damages likely to occur  
from the use of illy constructed Washing  
Machine, but it's bound to occur  
sooner or later. More often  
sooner than expected. You need  
fear no such results when using the



## WAYNE Combination Washer.

The only Washer of its kind in the world

For Prices and Discounts write

**Anthony Wayne Mfg. Co.,**  
FT. WAYNE, IND.

## The Laws of Business

FOR ALL THE  
States and Territories of the Union.

By THEOPHILUS PARSONS, LL.D.

864 pages, 6 x 9 inches; full leather, \$4.50.

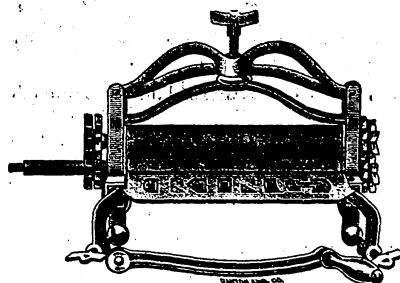
Contains information of the high-  
est value to business men, treating  
fully and clearly of contracts, sales,  
agency, agreements and assessments,  
stoppage and transitu, considerations,  
limitations, notes and bills of ex-  
change, interest and usury. Em-  
braces chapters on commercial law  
in general, bonds, assignments, guar-  
anty, the statute of frauds, receipts  
and releases, payment, partnership,  
arbitration, carriage of goods and  
passengers by railroad and other car-  
riers, hotel keepers, patents, copy-  
rights, statute of limitations, the law  
of place, shipping, marine, fire and  
life insurance, deeds of land, mort-  
gages of land, mortgages of personal  
property, leases, liens of mechanics  
and material men, the recovery of  
debts, wills, executors and adminis-  
trators, guardians, and the legal rights  
of farmers, &c. Also abstracts of the  
laws of all the States and Territories  
relating to the collection of debts,  
usury, the execution and acknowledg-  
ment of deeds, witness required to  
wills, holidays and days of grace,  
mechanics' liens, chattel mortgages,  
and nearly 300 approved forms which  
have been tested in courts.

Sent, post-paid, on receipt of price by

**DAVID WILLIAMS,**

*Bookseller and Publisher,*

96 - 102 READE ST., N. Y.



## We are Sole Manufacturers of the Celebrated Erie and King Wringers.

We also make all other brands of Wood and Iron  
Frame Wringers.

Exclusive sale of the **ERIE** and **KING** Wringers  
given to one dealer in each town.

Write for Catalogue.

**THE NATIONAL WRINGER CO.,** CANTON,  
OHIO.

New York Office, 107 Chambers St., John T. Ryan, Mgr.

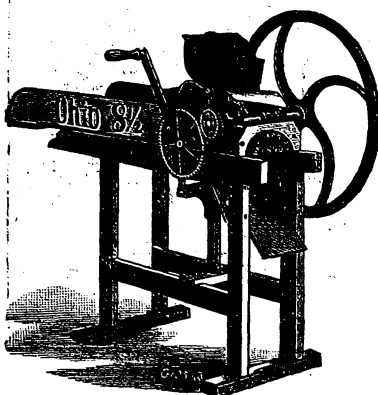
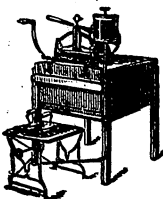
## WASHING DAY.

The saddest of all the year,  
It brings no rest, it brings no cheer.

But the "Columbian" (Self-Heating) Washer and Stove Combined makes "Washing  
Day" as good as the others of the week. Does away with all lifting, and being around a  
hot stove. Washes and boils the clothes at the same time. A wonderful seller.

SEND FOR A SAMPLE.

**BENBOW MFG. CO., - St. Louis, Mo.**



## THE "OHIO" Feed and Ensilage Cutters and Carriers are the best.

By reason of wide open throat (being  
full width of cutting surface, all sizes),  
and improved feeding device, our  
machines have greater capacity than  
others.

**THE SILVER MFG. CO.,** Salem, O.

LINDSAY BROS., - MILWAUKEE, } General  
MANLEY & THOMPSON, ST. LOUIS, } Agents.

# THE TROLLEY LEADER STORE LADDER.

See Our Advertisement Next Week.



Parlor, Barn and Fire Door Hangers

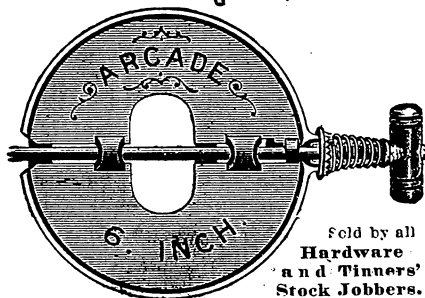
Aren't  
you Tired of  
Jumping up on the  
Counter?

Get a Leader Store Ladder

It Will Soon Save the Price.

THE COBURN TROLLEY TRACK MFG. CO., - HOLYOKE, MASS.

Made by **Arcade Mfg. Co.,** Freeport, Ill.



Sold by all  
Hardware  
and Tinnery  
Stock Jobbers.

**Burton's Improved Acme Shaft Coupling.**

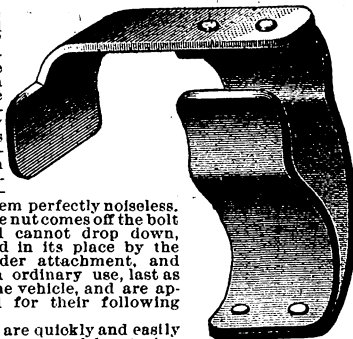
Patented Nov. 15, 1887.

A Perfect Anti-Rattler and Bolt Holder Combined.

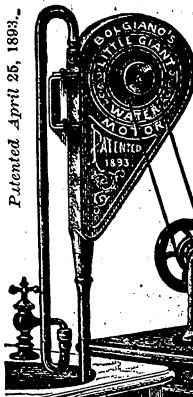
In the Improved "Acme" Anti-Rattler we offer an article that effectually prevents any rattling in the coupling, rendering them perfectly noiseless. In case the nut comes off the bolt the thill cannot drop down, being held in its place by the Bolt Holder attachment, and will, with ordinary use, last as long as the vehicle, and are appreciated for their following merits:

1. They are quickly and easily inserted or removed, by placing in position and drive in or out with a hammer, not being necessary to remove the bolt or shaft.
2. Their shape is such that they are held firmly in place by spring tension.
3. Being made of two pieces solidly riveted together, they will not break as others made of one piece do.
4. Being made of Crescent Patent Cold Rolled Steel, every pair are warranted to preserve their strength and elasticity, and not to bend or break with ordinary use.
5. By their use much annoyance is avoided, and very often valuable time saved.

Ask your jobber for them or send to  
**Columbian Novelty Co., North East, Pa.**



Patented April 25, 1893.



**NEW WATER MOTOR, \$5**

**BOLGIANO'S LITTLE GIANT, No. 1,**

Will run your Sewing Machine, Fans and other Light Machinery.

A Week's Work  
Done in a Day  
No Plumbing  
Required.

SOMERVILLE, MASS., Nov. 21, 1893.  
THE BOLGIANO MFG. CO., Baltimore, Md.  
Gentlemen:—Your No. 1 Motor just received. I am more than pleased with it. It will do all you claim for it. I have tried it with several different kinds of light machine work. I shall always have the best word to say for this little wonder. Yours truly,  
CHAS. E. PARKHURST, 79 Walnut St.

NOBLESVILLE, IND., Jan. 29, 1894.  
THE BOLGIANO MFG. CO., Baltimore, Md.

Gentlemen:—The "Little Giant" Water Motor came to hand in due time, and works the sewing machine like a charm.

Yours very truly,  
NOBLESVILLE MILLING CO.

**No. 2, \$10** Fans, Ice Cream Freezers, Lathes, Scroll Saws, Church Organs, etc.

COLORADO SPRINGS, COLORADO.

THE BOLGIANO MFG. CO., Baltimore, Md.  
Gentlemen:—We received the "Little Giant" Motor No. 2 on April 28, and have tested it in every possible way, and find that it works perfectly. At present it is running an eight and twelve old style Gordon press, and takes it at a very fast rate. We are more than pleased with it, and we will recommend it to everybody as a safe investment for their money. Yours respectfully,  
WOODS BROS.

**NO. 3 MOTOR, \$15.** For Fans, Printing Presses, Grindstones, All Sizes of Light Fans for sale. Coffee Mills, Washing Machines. Send for Circulars.

**NEW HOT AIR GAS IRON, \$3**

Bolgiano's Perfection Gas Iron enables you to do your ironing without the use of a stove, and is in every way superior to anything of the kind ever offered the public. Gets hot in 5 minutes and costs 5 cents a day to heat.

You may send me One Dozen Perfection Gas Irons. Sold 700 charcoal irons. Expect to sell many more of yours.  
**JOHN WANAMAKER, Philadelphia, Pa.**

Send for Descriptive Circulars.

**THE BOLGIANO MANUFACTURING CO.,**  
WHOLESALE AND RETAIL.

**415 WATER ST., BALTIMORE, MD.**



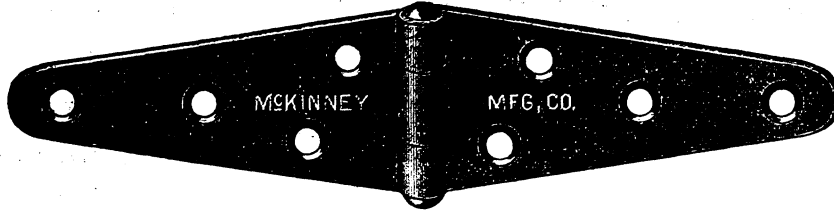
BOLGIANO'S PERFECTION GAS IRON.  
Patent applied for, 1894.

# STEEL HINGES AND BUTTS.

STANDARD GOODS.

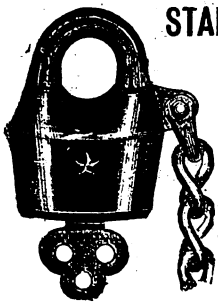
McKINNEY MFG. CO.. - ALLEGHENY, PENN.

SEND FOR  
LIST.



ORDERS FILLED  
ON SIGHT.

**"NONE BETTER."**

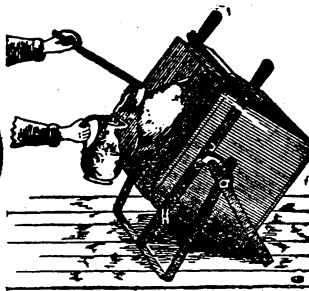


STAR LOCK WORKS, PHILA.

W. & L. WOLF,

MANUFACTURERS OF  
1st QUALITY ONLY  
SCANDINAVIAN

AND  
Spring Padlocks,  
Trunk & Case Locks,  
Carboy Stands, &c.  
Catalogues Sent on Application.



## THE CLARK MFG. CO.,

Blind Hinges, Gate Hinges, Door Butts,  
And other HARDWARE SPECIALTIES,  
BUFFALO, N. Y.

THE SCHULTZE LOCK  
UNPICKABLE.



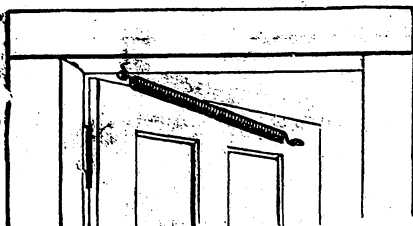
SEND FOR CIRCULAR.

MANUFACTURED ONLY BY

The Schultze Mfg. Co.

Cor. Emerald & Wishart Sts., Phila., Pa.

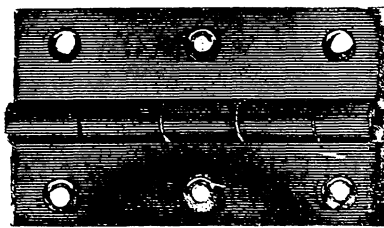
THE PERFECT DOOR SPRING.



Cheap, Simple, Durable, Effective.

Best Screen Door Spring made. Send for our list of references, comprising some of the first houses in the land. They sell readily, and that is what you are looking for. Drop us a postal.

COILED WIRE BELTING CO.,  
40 & 42 Noble St., Jersey City.



## Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

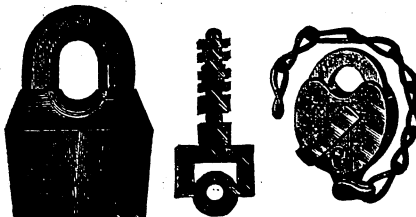
MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.

ESTABLISHED 1879.

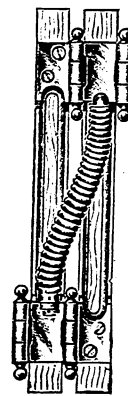
## KEYSTONE LOCK WORKS.

E. T. FRAM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of PADLOCKS, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. SELF-LOCKING Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

SUPPLESS, DUNN & ALDER, General Agents,  
97 Chambers St., NEW YORK.



Highest Award, World's  
Columbian Exposition,

— ON —

## SPRING BUTTS.

For Catalogue and Prices Address

CHICAGO SPRING BUTT CO.

CHICAGO, ILL.,

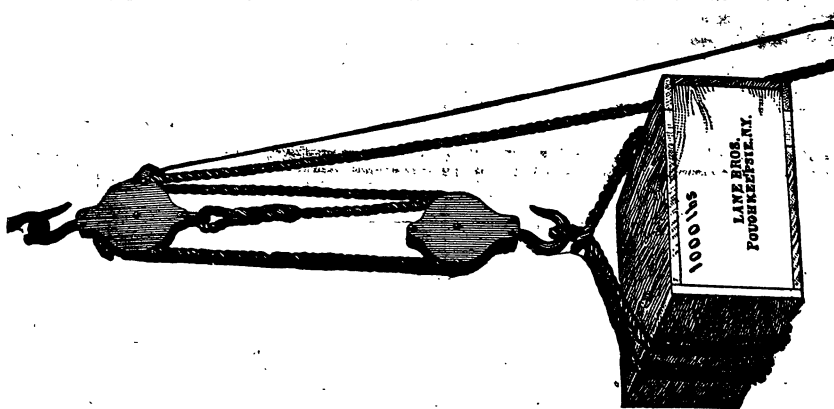
Or 97 Chambers Street, N. Y.



The Practical Catechism. A collection of questions on technical subjects, by manufacturers and others, and of answers thereto. By ROBERT GRIMSHAW, M.E., Ph.D. Treating of Miscellaneous engineering questions, and touching upon physical science, chemistry, etc. GENERAL TOPICS: Properties of Air; Alloys; Beams; Belts; Bricks; Building; Building Stones; Calculations; Cements; Chemical Processes; Coloring Metallic Objects; Combustion; Disinfectants; Fastenings; Fluxes; Foods; Foundry Practice; Fuels; Gas; Gear Wheels; Gravity; Hardening; Tempering and Annealing; Heating; Hydraulics; Iron and Steel; Limes, Mortars and Cements; Locomotives; Lubrications; Mechanical Processes; Metals in General; Millwrighting; Paints, Oils and Varnishes; Plants; Power; Railways; Ropes; Saws; Shaping; Solders; Strength of Materials; Sugars; Temperatures; Timber and Trees; Ventilation; Waters; Weights; Wines; Work Miscellaneous. 295 pages, cloth.....\$1.25

For sale by David Williams, 96-102 Reade





## LANE'S SELF-LOCKING TACKLE BLOCKS

Anti-Friction Steel Bushings.

Holds the load at any point, and always sure.

SEND FOR CIRCULAR.

For sale by the Hardware trade.

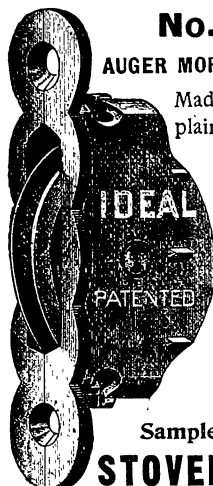
—MANUFACTURED BY—

**LANE BROS.**  
POUGHKEEPSIE, N. Y.

## Ideal Sash Pulley

No. 60—65.

AUGER MORTISE—FACE PLATE.



Made with two inch wheel, plain and polished, cone axle bearings, noiseless and easy running; markers on the side to lay off the centers to bore the holes by.

The best and most uniformly made low-priced Sash pulley on the market.

Sample Free.

**STOVER MFG. CO.,**  
145 River St., Freeport, Ill.

**THE WILCOX & HOWE COMPANY,**  
BIRMINGHAM, CONN.  
MANUFACTURERS OF

A Full Line of Carriage Hardware  
ALSO SPECIAL FORGINGS.

Estimates cheerfully given. Send for Catalogue.

## SASH WEIGHTS

**E. E. BROWN & CO.,**

McKean and Meadow Sts.,

PHILADELPHIA, PA.

## AN ELEGANT TRADE CATALOG

Attracts attention and makes customers. The addition of a highly artistic Embossed Cover creates a good impression at first glance. Our business is to design and make catalogs complete, including engravings.

**GRIFFITH,**

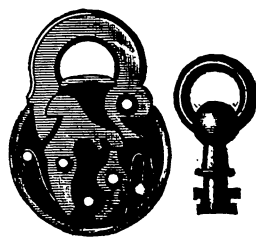
**AXTELL &**

**CADY CO.**

Holyoke, Mass.

Send six cents in stamps for our catalog "E," showing original Embossed Cover designs.  
DESIGNERS PRINTERS  
EMBOSSERS

## PATENT PERFECTION PADLOCK.



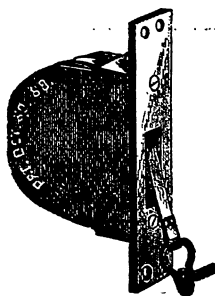
Eight Tumblers, Key Turning Both Ways.

Sizes,  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{2}$  and  $\frac{3}{4}$  inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

**AMES SWORD CO., Chicopee, Mass.**

Send for Price-Lists and Circulars.



## DOES IT PAY?

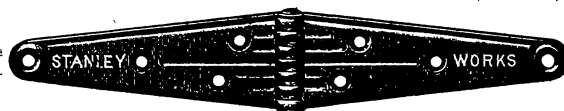
To buy an inferior article, which your trade condemns, when you can get

## THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the LEADER for five years. Write to

**CALDWELL MFG. CO., Rochester, N. Y.**

## Corrugated Wrought Steel Hinges.



COST NO MORE  
MUCH BETTER THAN THE OLD STYLE.

Try them and be convinced. For sale by the leading Jobbers of

**THE WORLD.**

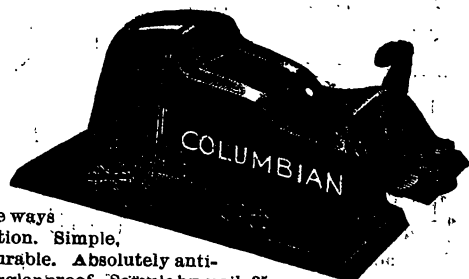
—MADE ONLY BY—

**THE STANLEY WORKS,** NEW BRITAIN, CONN.  
79 CHAMBERS ST., N. Y.

## Columbian

## Sash

## Lock.



Locks three ways with one motion. Simple, strong and durable. Absolutely anti-rattle and burglar proof. Sample by mail, 35c

**COLUMBIAN SASH & DOOR LOCK CO.,**  
WAUSEON, OHIO.



# RICHARD ECCLES,

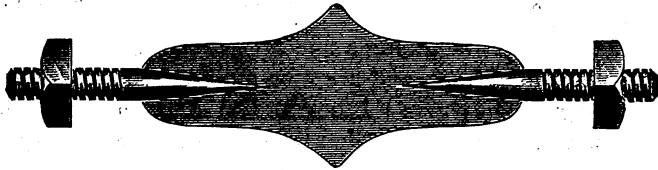
AUBURN, N. Y.,

—MANUFACTURER OF—

## CARRIAGE FORGINGS,

Couplings, Clips, King Bolts, Fifth Wheels, &c.

SEND FOR SUPPLEMENT TO CATALOGUE,



Showing a full line of Axle Clips, Spring Bar Clips and Three Piece Saddle Clips.

SEND FOR CATALOGUE AND SUPPLEMENT.

# SASH WEIGHTS!

NORTON BROTHERS,

Manufacturers,

Office: 813 Masonic Temple, CHICAGO.

WORKS AT MAYWOOD, ILL.

## WHY USE WOODEN OR HEAVY STEEL BLOCKS

WHEN THE STEEL AND IRON

# TACKLE BLOCKS

—MADE BY—

The Cleveland Block Co.,

CLEVELAND, OHIO, U. S. A.,

ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

General Agents: Topping Brothers, 92 Chambers Street, New York.  
New England Agents, - Dodge, Haley & Co., 212 High Street, Boston.

## McKinnon Dash and Hdw. Co., Ltd.,

MANUFACTURERS OF

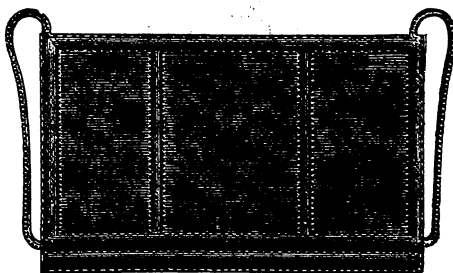
Dashes,  
Fenders.

Roll Up Straps,

Prop Block

Washers  
and

Shaft Leathers.



"A" PATTERN.

Largest Capacity in  
the World.

FACTORIES AT

Buffalo, N. Y.,

Columbus, O.,

St. Catharines, Ont.

STORE AT

Cincinnati, O.

## THE "EASY" BOLT CLIPPER.

WILL CUT ANYTHING.



Manufactured by  
H. K. PORTER,  
66 Beverly St.,  
Boston, Mass.

It is the Best in the World.  
For sale by the trade generally. SEND FOR CIRCULAR.

23,000 Sold.

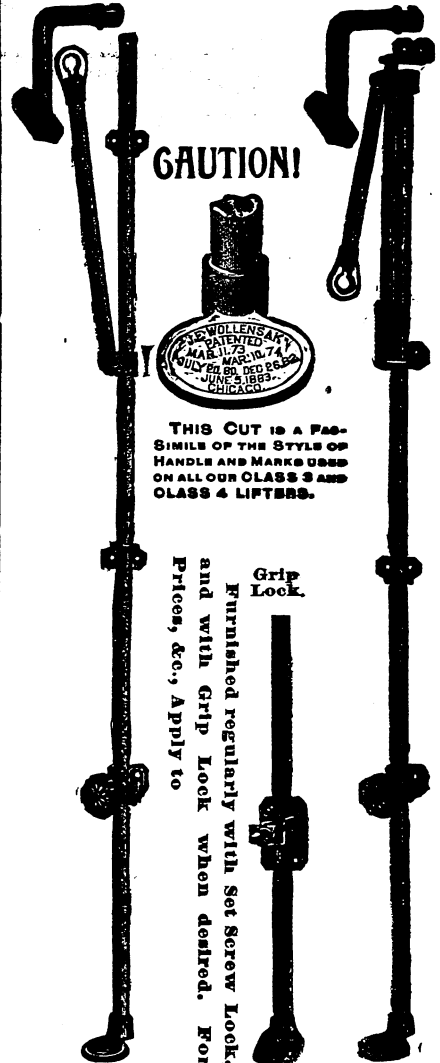
## Transom...Lifters

OLD RELIABLE

J. F. WOLLENSAK'S PATENT.

CLASS 3.

CLASS 4.



CAUTION!



THIS CUT IS A FAS-  
SIMILE OF THE STYLE OF  
HANDLE AND MARKS USED  
ON ALL OUR CLASS 3 AND  
CLASS 4 LIFTERS.

Furnished regularly with Set Screw Lock,  
and with Grip Lock when desired. For  
Prices, &c., Apply to

J. F. WOLLENSAK, - CHICAGO, ILL.

## READING HARDWARE COMPANY.

We manufacture the  
Celebrated "Duplex"  
Wrought Butts—  
Wrought Steel and  
Wrought Bronze.

They are better than  
the ordinary kinds in  
every way.

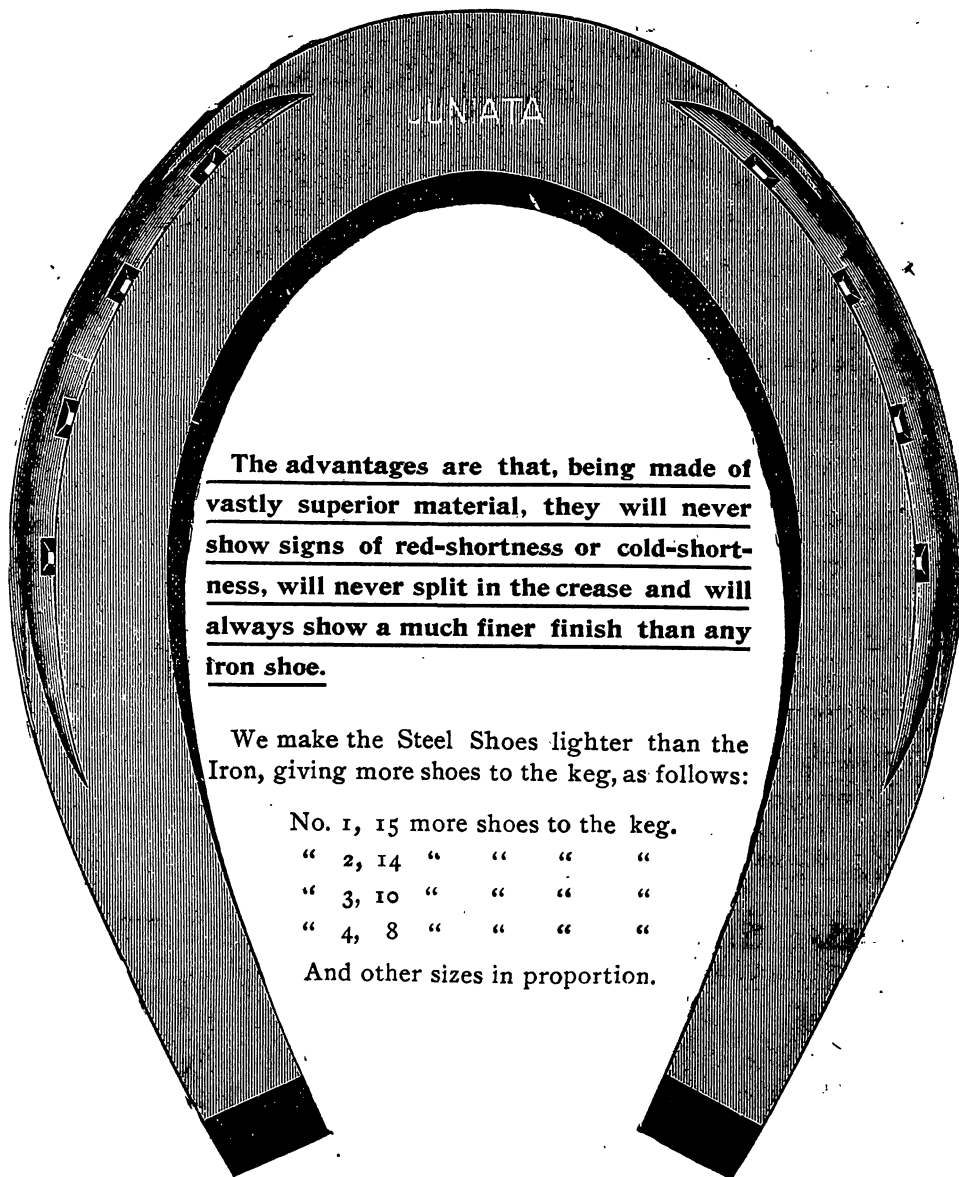
NEW YORK, PHILA., CHICAGO.

Factories, READING, PA.

# STEEL HORSE SHOES.

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 EXTRA SWAGED FRONT.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

## SHOENBERGER & CO.,

JUNIATA IRON AND STEEL WORKS - - - PITTSBURGH, PA.

**SCRANTON FORGING CO.,**

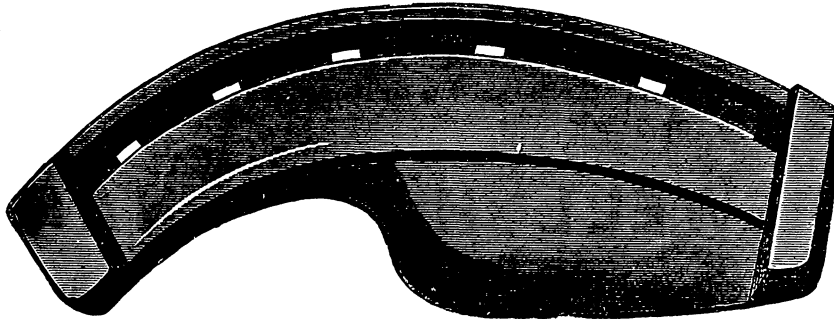
SCRANTON, PA

**CARRIAGE HARDWARE** AND**SPECIAL DROP FORGINGS.**

FORGED

OX

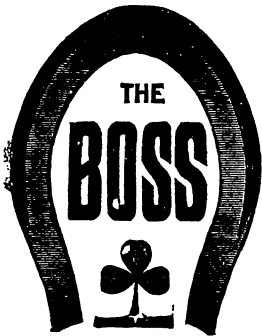
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.

**HORSE AND MULE SHOES.**

Superior Quality, Shape and Finish.

**BRYDEN HORSE SHOE CO.,****CATASAUQUA, PA.****RHODE ISLAND PERKINS HORSE SHOE CO.,**

MANUFACTURERS OF

**Horse and Mule Shoes of the Perkins Pattern.**

SPECIALTIES — X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

CHARLES E. STARK, Treas.

**J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.****THE NEW DIAMOND STATE HORSE AND MULE SHOES.****JUST TRY THEM and YOU will say they excel all others.**

MANUFACTURED BY

**DIAMOND STATE IRON CO.**  
**WILMINGTON, DELAWARE.**

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blau Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &amp;c.

PHILADELPHIA OFFICE,  
206 So. Fourth St.

{Correspondence invited}

NEW YORK OFFICE,  
11 Pine St.**Elegant Iron.****Beautiful Shape.****HORSE SHOES,***Light, Medium and Heavy.***MULE SHOES,***Light, Medium and Heavy.*

Illustrated booklet and prices to all parts of the world on application.

**OLD DOMINION IRON AND NAIL WORKS CO.,**

ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.

**BURDEN'S****HORSE SHOES.****"Burden Best"****Iron****Boiler Rivets.****The Burden Iron Co.**

TROY, N. Y.

**PHOENIX****HORSE SHOES.****PHOENIX HORSE SHOE CO.,**

ROLLING MILLS AND FACTORIES,

Poughkeepsie, N. Y.

Joliet, Ill.

NEW YORK OFFICE, No. 66 Reade St.

**Standard Horse Shoe Co.,**

Manufacturers of

**HORSE AND MULE SHOES.**

LEEDS, ROBINSON &amp; CO., General Agents,

4 Liberty Square, Boston, Mass.

**HIGHEST AWARD**  
—AT—  
**World's Columbian Exposition.**

In the tests submitted before the judges on awards  
the Capewell No. 6 was shown to be 17 per cent. tougher  
than No. 8 of other makes.

**CAPEWELL HORSE NAILS,**  
—MADE BY—  
**THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.**

**Office of D. G. BURNHAM,**  
Director of Works, World's Columbian Exposition,  
JACKSON PARK, CHICAGO, ILL.

October 28, 1893.

To THE CAPEWELL HORSE NAIL CO.:  
*Gentlemen—*I have used your horse nails here on the horses belonging  
to the World's Columbian Exposition, and I think they are far superior  
to any others that I have ever used. As I have been in the  
horseshoeing business for about twenty-five years, I know  
what I am talking about.  
Very respectfully,  
HERMAN J. HENKE,  
Foreman Blacksmith, World's Columbian Exposition.

"The Best  
Driving  
Nail."

"The Best  
Nail to  
Hold."

The  
Capewell  
Patent  
Corrugated  
Horse Nail.

Needs  
No  
Clinching.

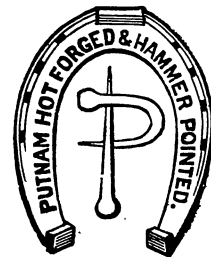
# Highest Award

FOR

## Supreme Excellence

TO

## The PUTNAM Hot-Stamped and Hammer-Pointed Horse NAILS,



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:  
"Supreme excellence in material, method in manufacture, and quality of finished product; elasticity  
and smoothness combined with holding power in clinch.  
It allows the use of very small nails."

There is nothing beyond "supreme excellence," nor is there anything comprised in a horse nail, except  
the "material from which it is made," "the method of manufacture," and "quality of finished product."  
Putnam nails, by their "elasticity," give slightly to the expansion and contraction of the hoof while  
the horse is in motion; by their "smoothness," do not enlarge the nail holes in the hoof, while their  
"supreme excellence," in "holding power in the clinch," enables them to hold the shoe in the hardest  
service until worn out.

By the "use of small nails," large holes are avoided and money saved to the smith.  
Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what  
qualities go to make up a good horse nail and that only the "Putnam" contains them all.

**PUTNAM NAIL CO.,**  
Neponset, Boston, Mass.

# H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

## CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

# FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

## CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,  
VERGENNES, VERMONT.

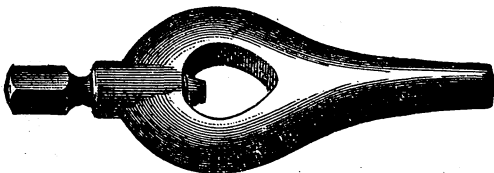
All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents, New York.

## LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.  
It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



No.	Inch.	Price.	No.	Inch.	Price.
1.....	2 1/2	\$0 60	11.....	2 1/2	\$1 45
2.....	3	70	12.....	3	1 60
3.....	1	70	13.....	3 1/2	1 80
4.....	1 1/4	80	14.....	4	2 10
5.....	1 1/2	80	15.....	4 1/2	2 75
6.....	1 3/4	95	16.....	5	3 25
7.....	1 1/2	95	17.....	5 1/2	4 00
8.....	1 3/4	1 10	18.....	6	5 00
9.....	2	1 20	19.....	7	6 00
10.....	2 1/4	1 35	20.....	8	7 00

One set to 2 inch, \$7.80. Full set, \$14.10

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

**C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.**  
These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

**P. F. BURKE, G. F. DEWICK & CO.**  
Manufacturers of  
**PATENT STEEL**  
(Blunt and Sharp)  
**TOE-CALKS.**  
—ALSO—  
BURKE'S IMPROVED  
**HORSESHOERS' FOOT VICE.**  
Send for Circulars.  
360 Dorchester Av. Die for Welding  
BOSTON, MASS. Sharp Calks.

Crescent

Horse and Mule Shoes,  
BAR IRON.

CRESCENT HORSE SHOE  
IRON CO.

Max Meadows, Va.

## Covert Pants Stretcher.



Before. After.

THE Covert "Pants Stretcher" will restore the pantaloons to their original shape and length.  
It removes all **WRINKLES and BAGGING AT THE KNEES**, giving them the appearance of having just left the tailor's hands.

It also holds the pants in a convenient position for brushing and cleaning.

The Stretcher cannot get out of order, and can be adjusted in the pants in a few seconds.

It being applied inside the pants, it obviates all objections prominent in other stretchers.

It is made of steel wire, and being in sections can be packed in a valise when traveling. Sold by the trade, or

Sample pair sent by mail to any address, free of postage, on receipt of \$1.00.

MANUFACTURED ONLY BY

**COVERT MFG. CO., West Troy, N. Y.**

**FROST'S ANTI-RATTLE**  
Pat. Jan. 20, 1880.  
Cut One-half Size.  
Sample pair sent to any hardware or saddlery firm by addressing  
**The Frost Thill Spring Co.,**  
Boston, Mass.

## Carriage Forgings

Of every description. Also Special Forgings.

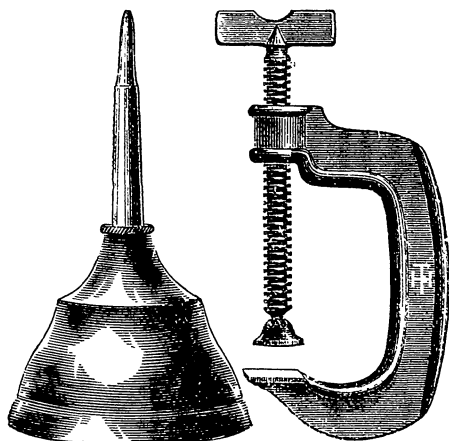
**E. D. CLAPP MFG. CO., Auburn, N. Y.**

New illustrated catalogue issued May 10th mailed on application.

# BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS

## PATENTED ARTICLES OF MALLEABLE IRON.

NEW pattern Heavy Screw Clamps. Strongest in the market.



HAMMER'S MALLEABLE IRON OILERS, 3 Sizes.  
HAMMER'S MALL. IRON HAND LAMPS  
HAMMER'S M. I. HANGING LAMPS.  
HAMMER'S ADJUSTABLE CLAMPS.

For sale by all the principal Hardware Dealers.  
Send for Price-List.

MALLEABLE IRON CASTINGS  
superior quality, and Hardware Specialties in  
Malleable iron made to order.

**HAMMER & CO.,**  
Branford, Conn.

## HARDWARE DEALERS

CAN RECOMMEND THE

## CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

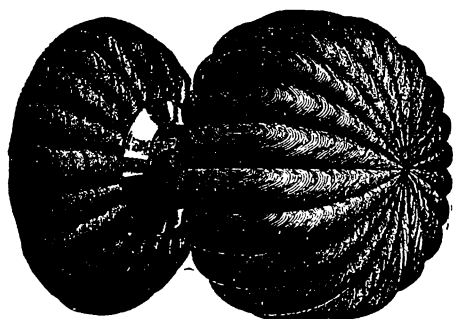
MANUFACTURED ONLY BY

**"THOMAS MORTON,"**

65 Elizabeth Street,

Write for Prices.

NEW YORK.



WOOD DOOR KNOBS,  
DOOR SPRINGS AND CHECKS  
AND CHECKING SPRING HINGES.

NEW GOODS. NEW PRICES.  
Send for New Price-List.

J. BARDSLEY, 149 & 151 Baxter St. New York.

Handbook of Ornament. By FRANZ SALES MEYER.  
A grammar of art industrial and architectural design in all its branches, for practical as well as theoretical use. Authorized English edition. 580 pages, illustrated, cloth..... \$3.60  
For Sale by David Williams, 36-102 Reade St., New York.



This Wrench can be Furnished with long Nut or Sleeve.

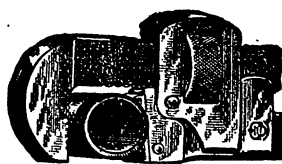
## COMBINATION WRENCH.

Case-Hardened Throughout.

Parts Interchangeable

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

**BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.**



## TRIMO PIPE WRENCH,

Forged Steel.

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no trouble in close quarters. Does not crush the pipe.

## TRIMO CHAIN PIPE WRENCH.



Superior in strength and ease of operation. COMPLETE circular grip. Never slips nor crushes.

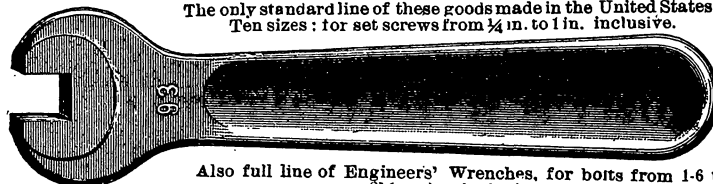
Can be used with one hand and in closer quarters than any other Basin Wrench. Parts Interchangeable.

TRIMO BASIN WRENCH.

**TRIMONT MFG. CO., ROXBURY MASS.**

## DROP-FORGED STEEL SET-SCREW WRENCHES.

The only standard line of these goods made in the United States.  
Ten sizes: for set screws from 1/4 in. to 1 in. inclusive.



Also full line of Engineers' Wrenches, for bolts from 1-6 to 2 3/4 inches inclusive.

**J. H. WILLIAMS & CO.,**

9 to 15 RICHARDS ST.,

—MANUFACTURERS OF—

BROOKLYN,

Brock's Patent Drop-Forged Chain Pipe Wrench,

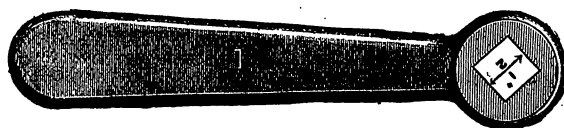
and Lathe Dogs, Collars, Thumbscrews and special Drop-Forgings of every description, from Iron, Steel, Copper and Bronze.

## HYDRAULIC FORGINGS



**WYMAN & GORDON, Worcester, Mass.**

## Box Tool Post Wrenches



Drop Forged from Bar Steel. Finished and Case Hardened.

**THE BILLINGS & SPENCER CO., Hartford, Conn.**

Drop Forgings of Every Description.





## LORING COES & CO.

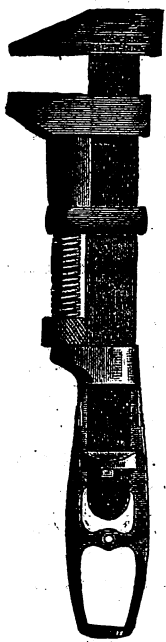
WORCESTER, MASS.

Manufacturers of **MACHINE KNIVES.**

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades

Etc., showing how the Steel is laid.



## L. COES'

Genuine Improved  
**KNIFE HANDLE**  
PATENT

## Screw Wrenches

MANUFACTURED BY  
**COES WRENCH CO.,**  
WORCESTER, MASS.

Established in  
1839.  
Registered  
March 31, 1874.

Patented July  
6, 1880.  
Patented July  
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

ST Straight Bar, Extra Long Nut for Screw in Jaw.

The BEST MADE and STRONGEST WRENCH in the MARKET.

J. C. McCARTY & CO.,  
JOHN H. GRAHAM & CO., } New York Agents.

• IMPROVED MINE LAMP •  
FOR ANTHRACITE AND  
BITUMINOUS  
MINING.

6  
DIFFERENT  
STYLES  
OF SPOUTS.

SAMPLE 15¢.

SEAMLESS  
BRASS  
COLLAR  
BRASS HINGE  
Lid Solid  
No SOLDERING

B. E. LEONARD, Scranton, Pa.

## THE "Columbia" SOCKET FORKS.

Trade-Mark.

Made in Hay,  
Manure and Spad-  
ing Fork Patterns.

Heavy and long-  
Steel Socket. Most  
elegant goods ever  
made.

The Iowa  
Farming Tool Co.,

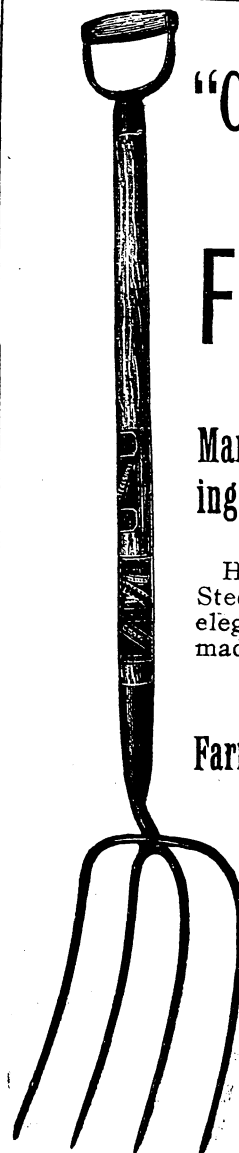
Makers of

FORKS, HOES,  
RAKES,  
SCYTHES,  
SNATHS, Etc.

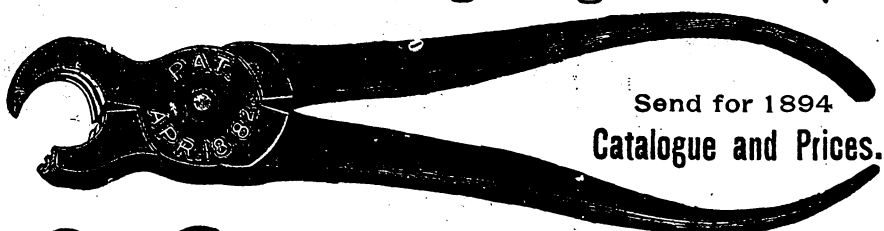
For export and  
home trade.

Catalog free on ap-  
plication.

FT. MADISON,  
IOWA, U. S. A.



## The "MAJOR" Hog Ring and Ringer.



Send for 1894  
Catalogue and Prices.



Hardware Specialties.  
**OAKES & IRWIN,**  
DECATUR, ILL.

## ELEMENTS OF COST.

By Frederick W. Child.

20 PAGES,

Paper, 25 Cents.

5 x 7 1/4 Inches.



An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry. Sent post-paid on receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.

# THE SOUTHERN H'DW'E JOBBERS' ASS'N.

All the members of this association and their customers are cordially invited to send for our printed matter relating to our various productions, it being to the interest of all such to have for ready reference such matter.

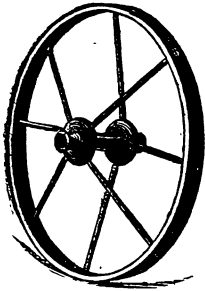
The Kilbourne & Jacobs Mfg. Co.,

Mfrs. of Wheelbarrows, Road Scrapers, etc.,

Columbus, Ohio, U. S. A.

## Toledo Wheelbarrow Works,

TOLEDO, OHIO.

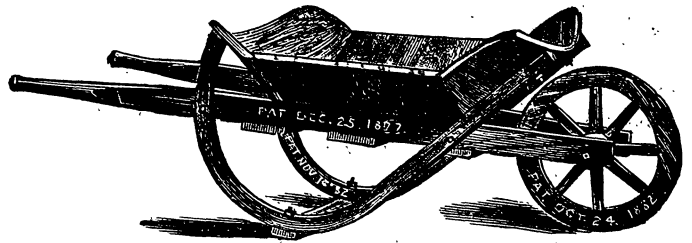


The cut at the left illustrates our new steel wheel that we put on our higher or finer grade barrows. With it we offer twice the strength that the ordinary barrows usually possess. Write for details of construction and prices.

G. W. THOMAS & CO.

## BENT LEG NO. 0.

PATENT JOINTLESS AND BOLTED.



## IDLEWILD HAMMOCKS.

TWELVE HAMMOCKS ASSORTED, } net to the dealer \$16.20.

## HOT WEATHER STUFF.

We are putting out sample bales of **IDLEWILD HAMMOCKS**, containing 12 numbers, all medium and low priced goods.

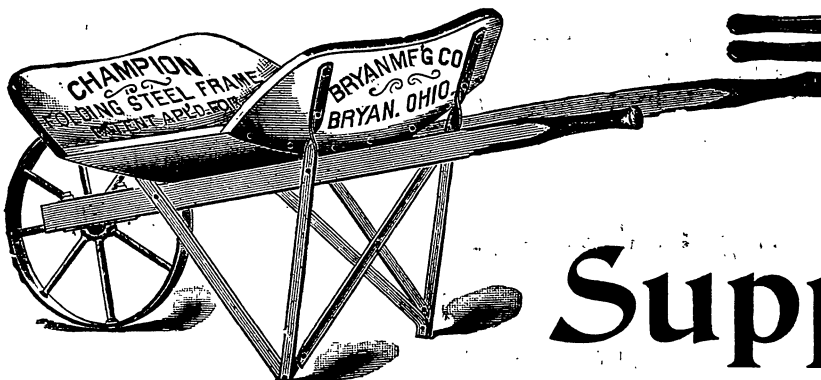
WILL PAY YOU 50% PROFIT.

JAMES W. EUSTIS COMPANY,  
Idlewild Hammock Mills,  
19 PEARL ST., BOSTON, MASS.

THIS IS THE SEASON.

SELLS WHEN NOTHING ELSE WILL.

NOW IS THE TIME.



## KNOCKED DOWN!

Occupies Space  
3 inches x 5 inches x 60 inches.

# Suppose

The best's the cheapest

You had a good thing to sell.  
We had a good thing to sell.  
You bought what we had to sell.  
You sold what we had to sell.  
The customer thought it the best of all.  
What would be the result of this supposition?  
If you can't guess it and would like to know,  
If you'll drop us a card we'll tell you.

## ALL STEEL WHEELBARROWS & SCRAPERS

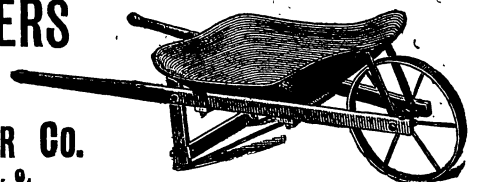
MANUFACTURED BY

AMERICAN STEEL SCRAPER CO.

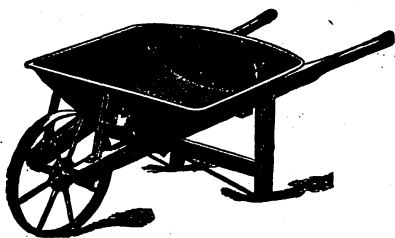
104 Court Street, SIDNEY, O.



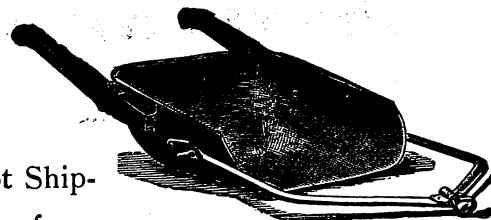
Write for Catalogue



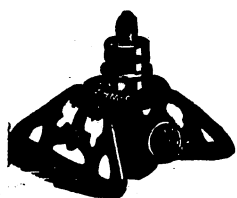
# HARD PAN Prices,



High Grade Goods, Prompt Shipments are what you receive from the



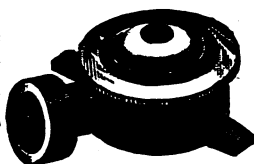
**Sidney Steel Scraper Co.,** 924 Poplar Street, **SIDNEY, OHIO.**



Japanese No. 12, Adjust.

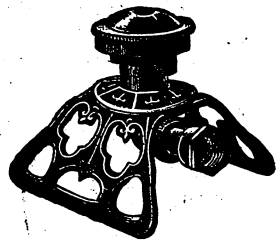
## LAWN SPRINKLERS.

Cactus No. 9.



We manufacture the BEST and CHEAPEST Lawn Sprinklers in the World.

The only Sprinklers which have no revolving parts to leak or wear out.  
The only Sprinklers free from small holes, and which cannot become clogged with gritty substances.  
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.  
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures.  
We also manufacture the old style revolving sprinklers, but for our own use would not have them.



Cactus No. 5.

**Ette & Henger Mfg. Co.**

ST. LOUIS, MO.

SEND FOR DESCRIPTIVE CIRCULARS.



National N. G.

## THE TEST OF 2 SEASONS

PROVES THE SUCCESS OF THE

**LITTLE GIANT**

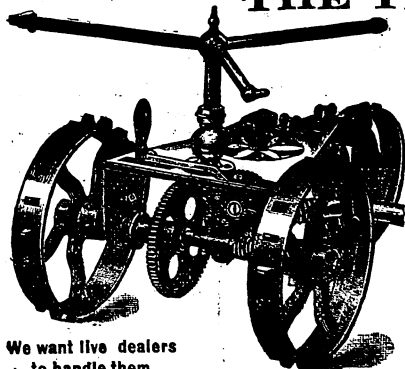
## Traveling Lawn Sprinkler.

PATENTED.

Can be set to travel anywhere from 15 to 500 feet per hour, either on a straight line or in a circle, and can be gauged to throw water over a swath 5 to 50 ft. in width.  
Highest Award at World's Columbian Exhibition.

SEND FOR CIRCULAR.

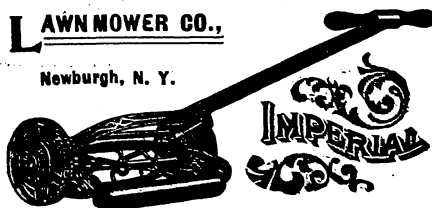
**Portland Lawn Sprinkler Co.,**  
PORTLAND, ME.



We want live dealers to handle them.

## COLDWELL LAWN MOWER CO.,

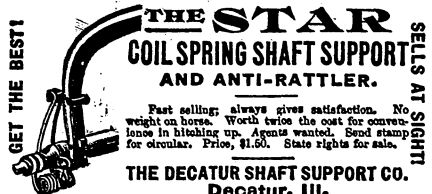
Newburgh, N. Y.



## THE BEST MOWER MADE.

The Lightest Running Mower in the World.

This is the only Lawn Mower that stood the test of working the entire season on the Columbian Exposition Grounds without any repairs.

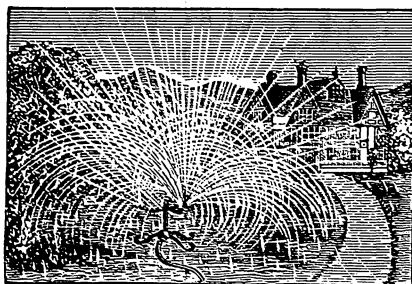


## THE STAR COIL SPRING SHAFT SUPPORT AND ANTI-RATTLER.

Fast setting; always gives satisfaction. No weight on horse. Worth twice the cost for convenience in hitching up. Agents wanted. Send stamp for circular. Price, \$1.50. State rights for sale.

**THE DECATUR SHAFT SUPPORT CO.**  
Decatur, Ill.

## GENUINE "CALIFORNIA" Lawn Sprinkler.

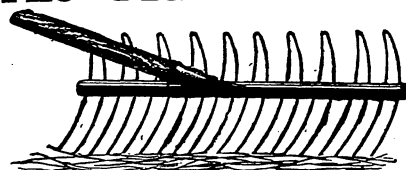


MANUFACTURED BY  
**BLAIR MANUFACTURING CO.**  
SPRINGFIELD, MASS.

Write for prices.

Also makers of the most complete line of Lawn Mowers on the market.

## The Old Reliable

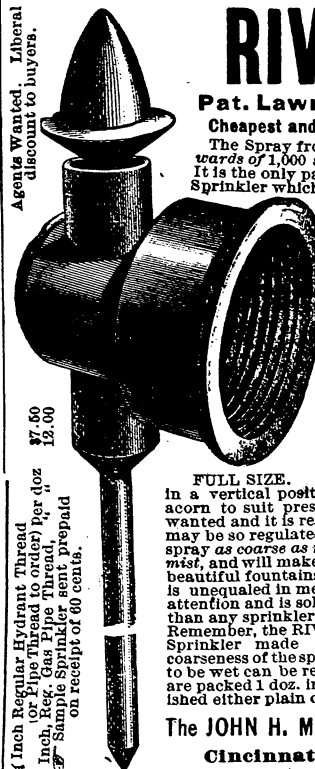


## DEALERS AND JOBBERS!

Do not be deceived by the **CHEAP** Sheet Metal imitations of our Rake. Take a sheet metal rake at each end and you can twist it **ALL OUT OF SHAPE!** They are **WEAK!** Don't be deceived into buying post-hole diggers that are flimsy imitations and offered as "just as good." Certain parties are copying nearly our whole line of goods, even to our style of ad., to deceive buyers. We have the **"ORIGINAL"** line of diggers, Rakes, Curry-Combs, Pruning Shears, &c. Ask for **KOHLER'S** and get the **GENUINE, ORIGINAL** and **BEST!**

**F. E. KOHLER & CO.,** Canton, Ohio.

Agents Wanted. Liberal discount to buyers.



\$7.50  
\$12.00

1/4 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread  
1/2 Inch Regular Hydrant Thread

## RIVAL

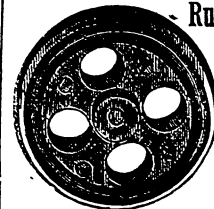
Pat. Lawn Sprinkle.  
Cheapest and Best in Use.

The Spray from it covers upwards of 1,000 sq. feet of lawn. It is the only patent adjustable Sprinkler which is adaptable to any water pressure. Being made of brass, and having no revolving parts, it will last for years. To operate, screw Sprinkler on end of hose, stick the rod in

to the ground in a vertical position, adjust the acorn to suit pressure and spray wanted and it is ready for use. It may be so regulated as to throw a spray as coarse as rain or as fine as mist, and will make one of the most beautiful fountains imaginable. It is unequaled in merit, requires no attention and is sold at a less price than any sprinkler in the market. Remember, the RIVAL is the only Sprinkler made by which the coarseness of the spray and the area to be wet can be regulated. They are packed 1 doz. in a box, and finished either plain or nickel plated.

The **JOHN H. MCGOWAN CO.**  
Cincinnati, Ohio.

## Rubber and Iron Wheels



Casters for Trucks,  
Baskets and Boxes!  
Heavy Casters for  
Mill use.  
Catalogues free.  
G. P. CLARK, Box 0,  
Windsor Locks, Conn.

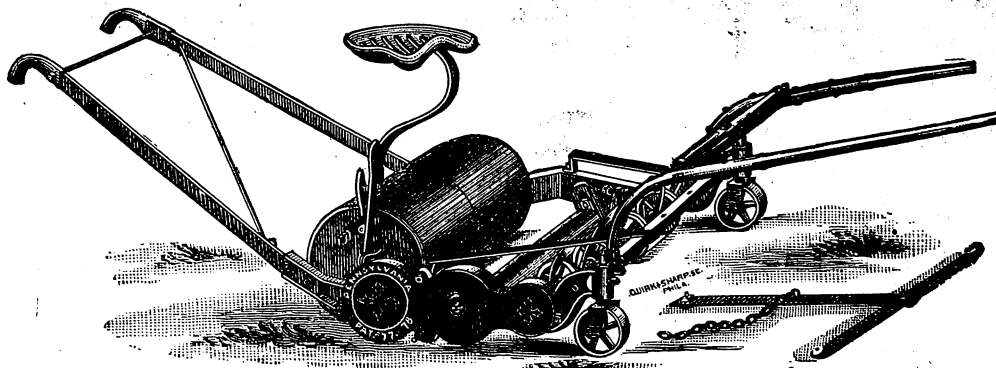
## EXPANSION BOLTS:



Manufacturers of Single and Double, For fastening all kinds of Structure to Brick and Stone Work. Catalogue furnished on application.  
**STEWART & ROMAINE MFG. CO.,** Philadelphia.

# PENNSYLVANIA HORSE LAWN MOWERS.

Made in  
both open  
and solid  
cylinder.



Almost  
noiseless  
in  
operation

Conceded by all who have used them to be the best and most durable Horse Mower on the market.

LIST, OPEN CYLINDER WITH DRAFT IRONS, \$110.00.  
" SOLID " " " 100.00.

PLEASE WRITE FOR DISCOUNTS.

**SUPPLEE HARDWARE CO., - PHILADELPHIA.**

## McGuire's ♦ Diamond.

MANUFACTURED BY

**Dille & McGuire Mfg. Co.,**

**RICHMOND, IND., U. S. A.**

### PRICE-LIST.

Wheels, 8 Inches High. Cutter, 5 1/2 Inches Diameter.

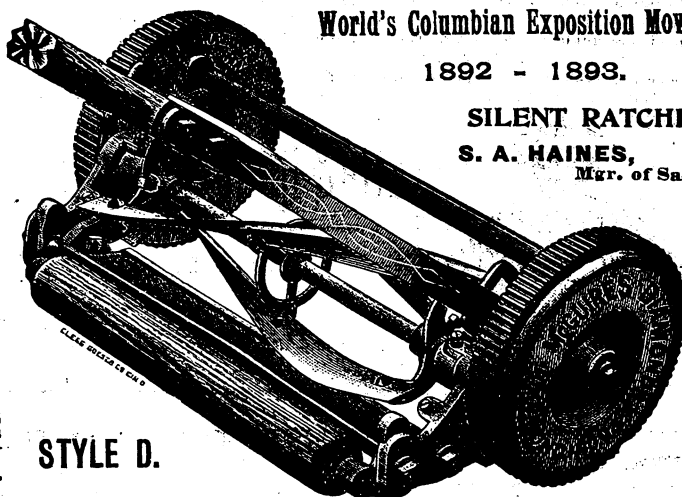
LENGTH.	LIST.	Discount to the
10 Inch	\$13.00	Trade,
12 "	14.00	70 per cent.,
14 "	15.00	F.O.B. Factory.
16 "	16.00	
18 "	17.00	

PHOSPHOR BRONZE JOURNAL BEARINGS. BEST QUALITY STEEL.

This is the Mower contracted for by the Chief of Construction at the Columbian Exposition; was used on the lawns at the World's Fair grounds during the preparatory season of 1892, and being approved by the Landscape Architects, was adopted exclusively for 1893.

If you wish a first-class Mower in all respects, one that is fully warranted,

—BUY MCGUIRE'S DIAMOND.—



STYLE D.

—OFFICIAL—  
World's Columbian Exposition Mower.

1892 - 1893.

SILENT RATCHET.

S. A. HAINES,  
Mgr. of Sales.

**Chadborn & Coldwell  
Mfg. Co.,**

NEWBURGH, N. Y.,

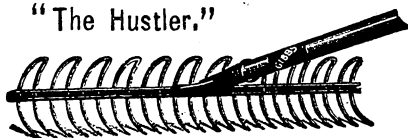
—Sole Manufacturers of—



New Model  
AND  
Excelsior  
LAWN  
MOWERS  
ALSO  
The Rival,  
The O K,  
Etc., Etc.

Send for Illustrated Catalogue.

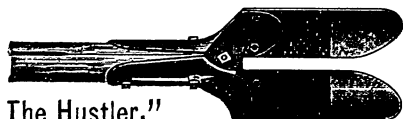
"The Hustler."



By buying the Hustler Lawn Rakes you have the cheapest and best made. All leading jobbers handle them.

**GIBBS MFG. CO., Canton, Ohio.**

Our line of Post Hole Diggers comprises 5 of the Best Known Styles on the market. Prices low.

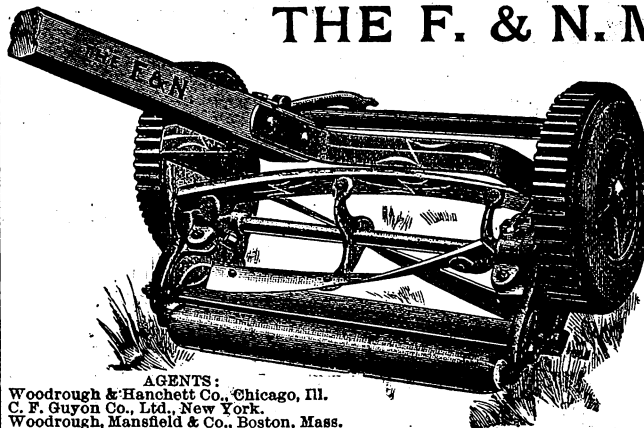


"The Hustler."

## THE F. & N. MFG. CO.,

Manufacturers of  
Lawn Mowers  
and  
Grass Catchers  
RICHMOND, IND., U. S. A.

**THE  
F. & N.  
LAWN  
MOWER  
"94."**



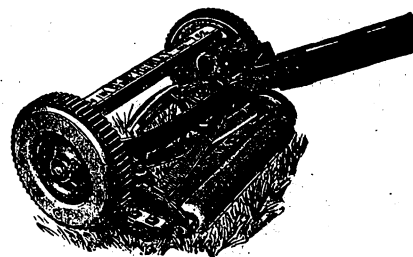
AGENTS:  
Woodrough & Hanchett Co., Chicago, Ill.  
C. F. Guyon Co., Ltd., New York.  
Woodrough, Mansfield & Co., Boston, Mass.

Solid Steel Cutter Bar. Reel  
Knives adjusted to Cutter  
Bar. Phosphor Bronze Reel  
Bearings.

## HENLEY'S MOWERS

For Lawns and Parks

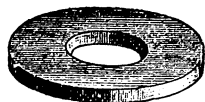
Are first class, high grade machines, made of the best materials, neat, symmetrical, strong and unexcelled in construction and ease of operation. Does perfect work. For prices, address



**M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.**

EASTERN REPRESENTATIVES: H. S. Earle, 110 and 112 N. Warren St., Syracuse, N. Y.; Wm. H. Cole & Sons, 13 S. Charles St., Baltimore, Md.; Carpenter & Bayles, 91 Chambers St., New York City.

# WROUGHT WASHERS



True  
to  
Gauge

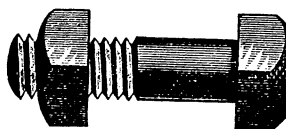
Made from *specially rolled* plate by our own *patented machinery*.

Every washer *flat*, with hole in *true center*. Sold in 200 lb. kegs, or 1 and 5 lb. paper boxes.

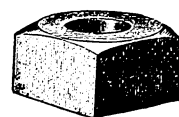
Get prices.

THE MILTON MANUFACTURING CO., MILTON, PA.

## HIGH GRADE



Machine  
Bolts



Hot pressed  
Nuts

Stamped to size. Guaranteed extra quality.  
Send for catalogue.

# Pennsylvania Bolt & Nut Co.

Lebanon Pa.

MANUFACTURERS OF

REFINED BAR IRON · MACHINE BOLTS · TRACK BOLTS · & BOLT ENDS

LAG SCREWS · GIMLET POINTED COACH SCREWS · HOT PRESSED & COLD PUNCHED SQUARE & HEXAGON NUTS

CHAMFERED & TRIMMED NUTS · WROUGHT & CAST WASHERS · TURN BUCKLES

STRUCTURAL & ELECTRICAL FORGINGS · BOILER & BRIDGE RIVETS · CAR FORGINGS & ARCH BARS

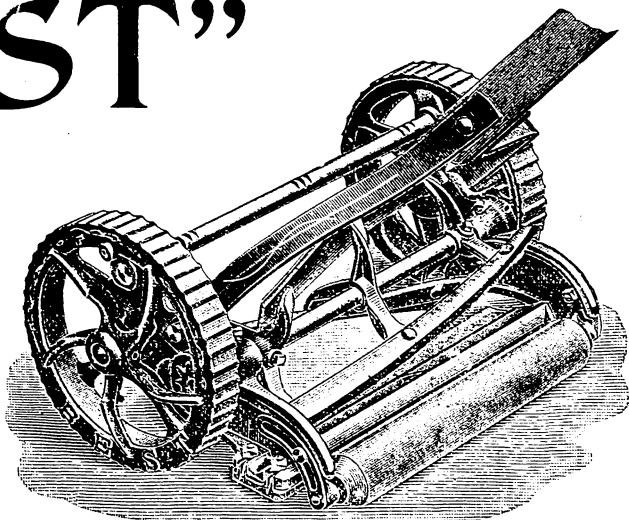
# "THE BEST"

## LAWN MOWER.

All wearing parts in sight and easy to get at for oiling. Made of the highest grade of material throughout, and is by far the best low priced machine on the market to-day.

GIVES ENTIRE SATISFACTION WHEREVER TRIED.

GET OUR PRICES BEFORE PLACING YOUR ORDERS.

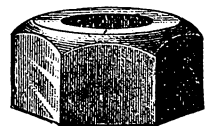


F. S. ANDERSON & CO.

RICHMOND, IND.

**BOLTS,** Machine, Car, Track, Pipe, Loom. | **NUTS,** Cold Punched

AMERICAN BOLT COMPANY, - - Lowell, Mass



PORTCHESTER BOLT & NUT CO.

Port Chester, N. Y.

MANUFACTURERS OF

BOLTS, NUTS, RIVETS and WASHERS

CHAMFERED AND TRIMMED.

SQUARE AND HEXAGON NUTS A SPECIALTY.

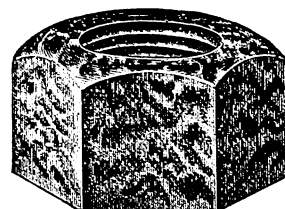
L

DUNHAM NUT CO.,

UNIONVILLE, CONN.,

Manufacturers of

All Grades  
of  
Finished  
Nuts  
and



Automatic Cold Press Nut Machines.  
SEND FOR CATALOGUE.

WM. H. HASKELL, PRESIDENT.

E. S. MASON, TREASURER.

D. A. HUNT, AGENT.

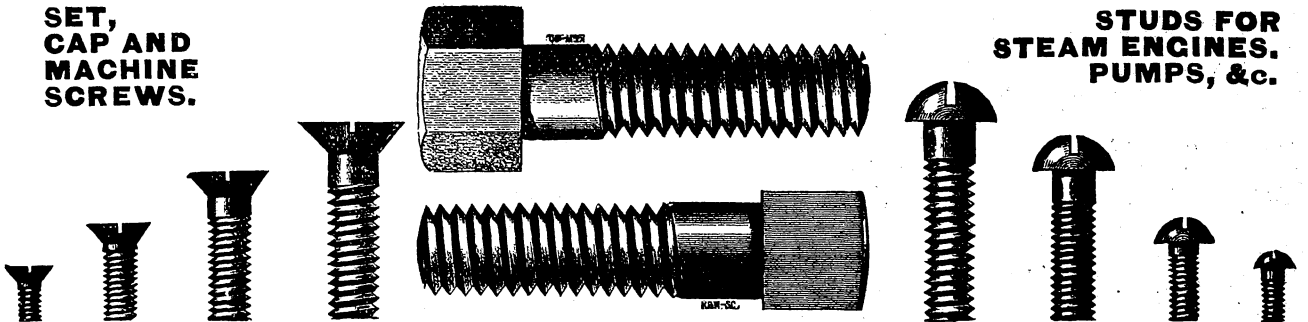
**WM. H. HASKELL CO.,**  
—MANUFACTURERS OF—

**GIMLET POINT COACH SCREWS**  **Bolts, Cold-Punched Nuts and Washers,**  
SUITABLE FOR MACHINERY OF ALL KINDS.

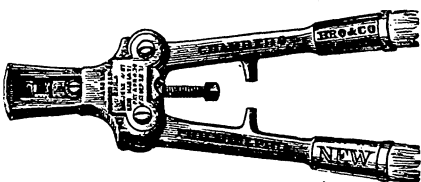
Office and Works: 451 Main St., PAWTUCKET, R. I., U. S. A.  
**HENRY B. NEWHALL CO., Agents,**  
105 CHAMBERS STREET, NEW YORK. - 47 PEARL STREET, BOSTON.

**WORCESTER MACHINE SCREW CO., Worcester, Mass.**

MANUFACTURERS OF

SET,  
CAP AND  
MACHINE  
SCREWS.STUDS FOR  
STEAM ENGINES.  
PUMPS, &c.**EXPANSION BOLTS.**

For Fastening all Kinds of Structure to  
Brick and Stone Work.  
Patentee and M'r, **ISAAC CHURCH.**  
Send for Catalogue. Toledo, O.

**BOLT & RIVET CLIPPERS,**

For cutting off the ends of Bolts and Rivets.  
Liberal discounts to the trade.

**CHAMBERS BROTHERS COMPANY**

52d St., BELOW LANCASTER AVE.,  
PHILADELPHIA, PA.

**WM. H. JACOBUS,**

No. 90 Chambers St., New York.

New York Office of

J. F. Wollensak.  
Barnes Mfg. Co.  
N. R. Streeter & Co.  
Geo. W. Nock.  
Tuck Mfg. Co.

Henis Vegetable Press.  
Dille & McGuire Mfg. Co.  
Bommer Bros.  
Palmer Hdw. Mfg. Co.  
Wire Goods Co.

National Rivet Works.  
Wolcott Hdw. Co.  
Fibre Head Mallet.  
Burnside Cedar Faucets.  
Cleveland Window Shade Co.

Zimmerman's Blind Adjusters.  
Garritt & Beach.  
Wilcox Mfg. Co.  
M. B. Schenck & Co.  
Hemacite Mfg. Co.

Franklin Mfg. Co.  
Atlas Mfg. Co.  
National Specialty Mfg. Co., Ltd.

**RIVETS**  
OF EVERY  
DESCRIPTION, FIRST QUALITY

**W. P. TOWNSEND & CO.**  
NEW BRIGHTON, PA.

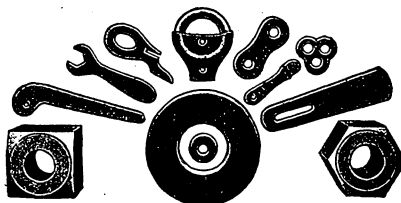
Illustrations of various rivet types: ROUND HEAD, CONE HEAD, WAGON BOX HEAD, BELT RIVET, COUNTERSUNK, FLAT HEAD, ROSE HEAD, TRUSS HEAD, SHEEP HEAD, and COUNTERSUNK HEAD.

ESTABLISHED 1865.

**J. H. Sternbergh & Son,** READING, PENNA.

**Bolts, Nuts, Washers, Rivets.**

Send for our New Catalogue and  
Discounts.



J. FRED WILSON, Worcester, Mass.

**Metal Punching and Die Work.**

Cold Punched Nuts and Washers  
for all Purposes.

SEND FOR PRICES ON  
SPECIALTIES IN LINE OF PRESS WORK.



# CLASSIFIED LIST OF ADVERTISERS.

## Agricultural Implements.

Iowa Farming Tool Co., Ft. Madison Iowa.  
Sickles, Sweet & Lyon, 35 Barclay St. N. Y.

## Air Compressors.

Norwalk Iron Works, S. Norwalk.

## Air Moving Machinery.

Howard & Morse, 46 Fulton, N. Y.

## Aluminum.

Illinois Pure Aluminum Co., Lemont, Ill.  
Pittsburgh Reduction Co., Pittsburgh.  
Scovill Mfg. Co., Waterbury, Conn.

## Aluminum, Brass and Bronze.

Gaylord, F. L. Co., Ansonia, Conn.  
Haight & Clark, Albany, N. Y.  
Pratt & Cady Co., Hartford, Conn.  
St. Louis Bronze & Aluminum Works, St. Louis, Mo.

## Analytical Chemists.

Britton, J. Blodgett, Philadelphia, Pa.  
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

## Anti-Friction Metals.—See Babbitt Metal.

## Anvil and Vise (Combination).

Fulton Iron & Engine Works, Detroit, Mich.

## Anvils.

Eagle Anvil Works, Trenton, N. J.

## Arms and Ammunition.

Chicago Fire Arms Co., Chicago, Ill.  
Harrington & Richardson Arms Co., Worcester, Mass.  
Hartley & Graham, 313 & 315 Broadway, New York.  
Ideal Mfg. Co., New Haven, Conn.  
Stevens, J. Arms and Tool Co., Chicopee Falls, Mass.  
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

## Attorney at Law.

Coleman, I. A., Chicago, Ill.

## Auctioneers.

Bissell, E. Son & Co., N. Y.

## Axes.

Peck, A. G. & Co., Cohoes, N. Y.

## Axles, Springs, &c., Manufacturers of.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.  
Wurster, F. W. & Co., Brooklyn, N. Y.

## Babbitt Metal.

Crown Smelting Co., Chester, Pa.  
Hertz, T. & Son, St. Louis, Mo.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
Reeves, Paul S., Philadelphia, Pa.  
Syracuse Smelting Works, Syracuse, N. Y.

## Bakers and Roasters.

Bronson Supply Co., Cleveland, Ohio.

## Bale Ties.

Kilmer Mfg. Co., Newburg, N. Y.

## Barb Wire and Fence.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.  
Indiana Wire Fence Co., Crawfordsville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
Washburn & Moen Mfg. Co., Worcester.

## Bar Iron, Manufacturers of.

Adams-Standard Iron & Steel Co., Bridgeport, Ohio.  
Allentown Rolling Mill, Allentown, Pa.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Montour Iron & Steel Co., Danville, Pa.  
Mahoning Valley Iron Co., Youngstown, Ohio.  
Sternbergh, J. H. & Son, Reading, Pa.

## Barrel Openers.

Specialty Mfg. Co., Hartford, Conn.

## Bellows, Manufacturers of.

Scott, Geo. M., Chicago, Ill.

## Bells.

Bevin Bros. Mfg. Co., East Hampton.

## Belt Dressing.

Jos. Dixon Crucible Co., Jersey City, N. J.

## Belt Fasteners.

Bristol Co., Waterbury, Conn.  
Claffen Mfg. Co., Cleveland, Ohio.  
Talcott, W. O., Providence, R. I.

## Belting, Makers of.

Alexander Bros., 412 N. 3d, Phila.  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Engineering Co., Phila., Pa.  
Main Belting Co., Philadelphia, Pa.  
N. Y. Belting & Packing Co., Ltd., N. Y.  
Roberts Mfg. Co., Pittsburgh, Pa.  
Shultz Belting Co., St. Louis, Mo.  
Stanley Works, New Britain, Conn.

## Bending Rolls.

Wickes Bros., Saginaw, Mich.

## Bicycle Locks.

Independent Electric Co., Chicago, Ill.

## Bicycles and Bicycle Sundries.

Bevin Bros. Mfg. Co., E. Hampton, Mass.  
Bridgeport Gun Implement Co., 313-315 Broadway, New York.

Bronson Supply Co., Cleveland, O.  
Crawford Mfg. Co., Hagerstown, Md.  
Eagle Bicycle Mfg. Co., Torrington, Ct.  
Eclipse Bicycle Co., Beaver Falls, Pa.  
Grand Rapids Cycle Co., Grand Rapids, Mich.

Haines & Zimmermann, 407 Cherry Street Philadelphia.  
Harris Mfg. Co., Buffalo, N. Y.  
League Cycle Co., Hartford, Conn.  
Lovell, Jno. F. Arms Co., Boston, Mass.  
Pope Mfg. Co., Boston, Mass.  
Read, Wm. & Sons, Boston, Mass.  
Remington Arms Co., 313-315 Broadway, New York.  
Stearns, E. C. & Co., Syracuse, N. Y.  
Sterling Cycle Works, Chicago, Ill.

## Bit Braces.

Amidon Tool Corp., Buffalo, N. Y.

## Blocks, Tackle, Makers of.

Cleveland Block Co., Cleveland, O.  
Fulton Iron & Engine Works, Detroit, Mich.  
Union Hardware Co., Torrington, Ct.

## Blowers.

Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Huvett & Smith Mfg. Co., Detroit, Mich.  
Sturtevant, B. F. & Co., Boston, Mass.

## Boiler Plates.

Carbon Steel Co., Pittsburgh, Pa.  
McIlvain, Wm. & Sons, Reading, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Pottstown Iron Co., Pottstown, Pa.

## Boilers, Copper.

Randolph & Clowes, Waterbury, Conn.

## Boilers, Steam.

Babcock & Wilcox Co., 30 Cortlandt, Chandler & Taylor Co., Indianapolis, Ind.  
Fulton Steam Boiler Works and Fdry., Richmond, Ind.  
Harrison Safety Boiler Wks., Phila., Pa.  
Pollock, W. B. & Co., Youngstown, O.  
Porter, H. K., Boston, Mass.  
Southwark Fdy. & Mch. Co., Phila., Pa.  
Sterling Co., Chicago, Ill.  
Wetherill, Robt. & Co., Chester, Pa.

## Bolt Cutters.

Chambers Bros. Co., Philadelphia.  
Howard Iron Works, Buffalo, N. Y.  
Reece, Edw. F., Greenfield, Mass.  
Wells Bros. & Co., Greenfield, Mass.

## Books.

Republic Press, 14 Lafayette Place, N. Y.  
Williams, David, 96-102 Reade, N. Y.

## Box Banders.

Goodell, J. W., Burlington, Vt.

## Box Straps and Corners.

Cary Mfg. Co., 5 to 9 Elm St., N. Y.

## Boxes, Hdw. Shelf, &c.

Green, A. H., 22 Park Place, N. Y.

## Brass, Manufacturers of.

Ansonia Brass & Copper Co., N. Y.  
Davel, John & Sons, 100 John, N. Y.  
Plume & Atwood Mfg. Co., N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass & Copper Co., N. Y.  
Scovill Mfg. Co., Waterbury, Conn.  
Waterbury Brass Co., 296 B'way, N. Y.

## Brass Butt Hinges.

Tiebout, W. & J., 16 & 18 Chambers.

## Brass Founders.

Cramp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.  
Lynons-Evans Mfg. Co., Philadelphia, Pa.  
Fram, E. T., Lancaster, Pa.  
Haight & Clark, Albany, N. Y.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
North Bros. Mfg. Co., Phila., Pa.  
Reeves, Paul S., Philadelphia.

## Brass Goods.

Brass Goods Mfg. Co., 88 Chambers.

## Bread and Cake Knives.

Cincinnati Mfg. Co., Cincinnati, O.  
Claus Shear Co., Fremont, O.

## Bridge Builders.

Berlin Iron Bridge Co., East Berlin, Ct.

## Bronze (Tobin).

Ansonia Bronze & Copper Co., 19-21 Cliff Street, N. Y.

## Brooms and Brushes.

Lay, Jos. & Co., Ridgeville, Ind.  
Rice Mfg. Co., New Durham, N. H.

## Builders' Hardware.

Deitz, A. E., 97 Chambers St., N. Y.  
Reading Hdw. Co., Reading, Pa.  
Yale & Towne Mfg. Co., Stamford, Ct.

## Butchers' Steels.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.

## Butcher and Shoe Knives, Manufacturers of.

Chatillon, John & Sons, 85-89 Cliff St. N. Y.  
Goodell Co., Antrim, N. H.  
Wilson, John, Sheffield, England.

## Butts and Hinges.

Clark Mfg. Co., Buffalo, N. Y.  
McKinney Mfg. Co., Allegheny, Pa.  
Sabin Machine Co., Montpelier, Vt.  
Stanley Works, New Britain, Conn.  
Tiebout, W. & J., 16 Chambers, N. Y.  
Wrightsville Hdw. Co., Wrightsville, Pa.

## Calipers and Dividers.

J. Stevens Arms and Tool Co., Chicopee Falls, Mass.  
Starrett, L. S., Athol, Mass.

## Car Axles.

Roberts, A. & P. & Co., Phila.

## Carboy Stands.

Wolf, W. & L., Philadelphia, Pa.

## Carriage Hardware, Makers of.

Clapp, E. D. Mfg. Co., Auburn, N. Y.  
Cover's Saddlery Works, Farmer, N. Y.  
Eccles, Richard, Auburn, N. Y.  
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.  
Scranton Forging Co., Scranton, Pa.  
Smith, H. D. & Co., Plantsville, Conn.  
Wilcox & Howe Co., Birmingham, Conn.

## Cartridge Reloading Tools.

Ideal Mfg. Co., New Haven, Conn.

## Cavvers' Tools.

White & Johnson & Co., 15-17 Chatham Square, N. Y.

## Casters, Wheel, &c.

Clark G. P., Windsor Locks, Conn.

## Castings Cleaning Apparatus.

Tilghman's Patent Sand Blast Co., Ltd., Sheffield, England.

## Castings, Iron and Steel.

Allentown Hdw. Wks., Allentown, Pa.  
Booth, The Lloyd Co., Youngstown, O.  
Boston Casting Co., So. Boston, Mass.  
The Burr & Houston Co., Brooklyn, N. Y.  
Cheney, S. & Son, Manlius, N. Y.  
Chester Steel Casting Co., Phila.  
Chrome Steel Works, Brooklyn, N. Y.  
Eureka Cast Steel Co., Chester, Pa.  
Flagg, Stanley G. & Co., Phila.  
Garland Foundry Co., Cleveland, O.  
Haight & Clark, Albany, N. Y.  
King & Andrews Co., Chicago, Ill.  
Palmer & De Mooy Fdry. Co., Cleveland, O.  
Pratt & Cady Co., Hartford, Conn.  
Sessions Foundry Co., Bristol, Conn.  
Spencer's I. S. Sons, Guilford, Conn.  
Standard Fdy. & Mfg. Co., Cleveland, O.  
Walker Mfg. Co., Cleveland, Ohio.  
Wetherill, Robert & Co., Chester, Pa.

## Castings, Malleable.

ArCADE Malleable Iron Co., Worcester, Mass.

Dayton Malleable Iron Co., Dayton, O.

Hammer & Co., Branford, Conn.

## Catalogue Files.

Folding Paper Box Co., So. Bend, Ind.

## Chains.

Bradlee & Co., Philadelphia.

Link Belt Engineering Co., Phila., Pa.

McKay, Jas. & Co., Pittsburgh, Pa.

## Chimneys.

Phila. Engineering Works, Phila., Pa.

## Cherry Stoners.

Enterprise Mfg. Co., Phila., Pa.

Goodell Co., Antrim, N. H.

## Chisels, Manufacturers of.

Buck Bros., Millbury, Mass.

Buck, Chas., Millbury, Mass.

White, L. & I. J. Co., Buffalo, N. Y.

## Chucks.

Cushman Chuck Co., Hartford, Conn.

Skinner Chuck Co., New Britain, Conn.

Smith & Egge Mfg. Co., Bridgeport.

Union Mfg. Co., 103 Chambers, N. Y.

Whitton, D. E. Mach. Co., New London, Conn.

## Clamps.

Hammer & Co., Branford, Conn.

Le Count, C. W., So. Norwalk, Conn.

## Coal.

Barns, C. K. & Co., Philadelphia, Pa.

Wister, Francis, Philadelphia, Pa.

## Coffee Mills.

Parker, Chas. Co., Meriden, Conn.

Sun Mfg. Co., Greenfield, Ohio.

Waddell Wooden Ware Works, Greenfield, Ohio.

## Coke.

Barns, C. K. & Co., Philadelphia, Pa.

Houston, C. B. & Co., Philadelphia, Pa.

Rainey, W. J., Cleveland, O.

Wister, Francis, Philadelphia, Pa.

## Collections.

Hardware Board of Trade (Limited), 4 and 6 Warren, N. Y.

## Condensers.

Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

## Conveying Machinery.

Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.

Jeffrey Mfg. Co., Columbus, O.

Link-Belt Engineering Co., Phila., Pa.

## Copper.

Anes Sward Co., Chicopee, Mass.

Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.

Hendricks Bros., 49 Cliff, N. Y.

New Haven Copper Co., 294 Pearl, N. Y.

Randolph & Clowes, Waterbury, Conn.

Rome Brass & Copper Co., Rome, N. Y.

Wister, Francis, Philadelphia, Pa.

## Cordage.

Samson Cordage Works, Boston, Mass.

## Cork Screws.

Williamson, C. T. Wire Novelty Co., Newark, N. J.

## Corrugated Furnaces.

Continental Iron Wks., Brooklyn, N. Y.

## Corrugated Iron.

Cincinnati Corrugating Co., Piqua, O.  
Cambridge Roofing Co., Cambridge.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Moseley Iron Bridge & Roof Co., 5 Dey, N. Y.  
N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.

## Counting Machines.

Durant, W. N., Milwaukee, Wis.

## Cranes.

Detroit Foundry Equipment Co., Detroit, Mich.  
Halsey, W. S. & Co., Birdshoro, Pa.  
Maris & Beskey, Philadelphia, Pa.  
Ridgway, Craig & Sons, Coatesville, Pa.  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Yale & Towne Mfg. Co., Stamford, Conn.

## Cupolas, Hot Blast.

Byram & Co., Detroit, Mich.  
Detroit Foundry Equipment Co., Detroit, Mich.

## Curry Combs.

Gibbs Mfg. Co., Canton, O.

## Cutlery, Importers of.

Sickles, Sweet & Lyon, 35 Barclay, N. Y.

## Cutlery, Manufacturers of.

Bingham, W. Co., Cleveland, Ohio.  
Dame, Stoddard & Kendall, Boston, Mass.  
Goodell Co., Antrim, N. H.  
Northampton Cutlery Co., Northampton, Mass.  
Wilson, John, Sheffield, England.

## Cutlery Display Cases.

Union Show Case Co., Chicago, Ill.

## Cyclometers.

Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.

## Dampers.

ArCADE Mfg. Co., Freeport, Ill.

## Dashes and Fenders.

McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.

## Dies.

Wilson, J. Fred, Worcester, Mass.

## Die Forgings and Castings.

Bliss, E. W. Co., Brooklyn, N. Y.

## Dog Collars.

Union Hardware Co., Torrington, Ct.

## Door Checks and Springs.

Bardsley, J., 149 & 151 Baxter St., N. Y.

## Door Springs.

Coiled Wire Belting Co., Jersey City, N. J.

## Drilling Machines.

- Egg Beaters.**  
North Bros. Mfg. Co., Philadelphia, Pa.
- Electric Bells and Supplies.**  
Ostrander, W. R. & Co., 204 Fulton St., New York.  
Wollensak, J. F., Chicago, Ill.
- Electric Dynamo Machines.**  
Eddy Electric Mfg. Co., Windsor, Conn.  
Hanson & Van Winkle Co., Newark, N.J.
- Elevators, Makers of.**  
Link-Belt Engineering Co., Phila., Pa.  
Morse, Williams & Co., Phila., Pa.  
Penna. Elevator Engineering Co., Phila., Pa.  
Warner Elevator Mfg. Co., Cincinnati, Ohio.
- Emery and Emery Wheels.**  
N. Y. Belting & Packing Co., Ltd., N. Y.  
Northampton Emery Wheel Co., Leeds, Mass.  
Norton Emery Wheel Co., Worcester, Mass.  
Sterling Emery Wheel Co., 174 Fulton St., N. Y.  
Sturtevant Mill Co., Boston, Mass.  
Taite Co., Stroudsburg, Pa.
- Emery Wheel Dressers.**  
Bay State Stamping Co., Worcester, Mass.
- Engineers and Contractors.**  
Aiken, Henry, Pittsburgh, Pa.  
Artificial Gas Engineering Co., Pittsburgh, Pa.  
Herrick, J. A., 284 Pearl St., N. Y.  
Kennedy, Julian, Pittsburgh, Pa.  
Laughlin, Alex. & Co., Pittsburgh, Pa.  
Lean, D. R., Co., Pittsburgh, Pa.  
McClure, Amsler & Co., Pittsburgh, Pa.  
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.  
Smythe, S. R. Co., Incorporated, Pittsburgh, Pa.  
Swindell, W. & Pittsburgh, Pa.
- Engines, Gas and Gasoline.**  
Buckeye Mfg. Co., Union City, Ind.  
Otto Gas Engine Works, Phila., Pa.  
Rollason Gas Engine, Havemayer Bldg., N. Y.  
Springfield Gas Engine Co., Springfield, Ohio.
- Engines, Steam, Makers of.**  
Bass Foundry & Machine Works, Ft. Wayne, Ind.  
Chandler & Taylor Co., Indianapolis, Ind.  
Lane & Bodley Co., Cincinnati, Ohio.  
Norwalk Iron Works Co., So. Norwalk, Conn.  
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.  
Phila. Engineering Works, Phila., Pa.  
Southwick Foundry & Machine Co., Phila., Pa.  
Tod, William & Co., Youngstown, O.  
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.  
Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**  
Sweetser, W. A., Brockton, Mass.
- Expansion Bolts.**  
Boone, W. C. Mfg. Co., Boonton, N. J.  
Church, Isaac, Toledo, O.  
Steward & Romaine Mfg. Co., Phila., Pa.
- Exporters.**  
Flint & Co., 68 Broad St., N. Y.
- Faucets, Self-Measuring.**  
Lane Bros., Poughkeepsie, N. Y.
- Faucets, Wooden, Makers of.**  
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters and Purifiers.**  
Davis, I. B. & Son, Hartford, Conn.  
Goubert Mfg. Co., 32 Cortlandt St., N. Y.  
Harrison Safety Boiler Works, Phila., Pa.  
National Pipe Bending Co., New Haven, Conn.  
Taunton Locomotive Mfg. Co., Taunton, Mass.  
Webster, Warren & Co., Camden, N. J.  
Whitlock Coll Pipe Co., Elmwood, Conn.
- Fencing, Iron and Wire.**  
Sarnum, E. T., Detroit, Mich.  
Champion Iron Co., Kenton, O.  
Cleveland Fence Co., Indianapolis, Ind.  
Clinton Wire Cloth Co., Clinton, Mass.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Kilmer Mfg. Co., Newburgh, N. Y.  
McCallip Fence & Wire Wks., Columbus, Ohio.  
Randall Fence Co., Le Roy, N. Y.  
The Van Dorn Iron Works Co., Cleveland, O.
- Files, Importers of.**  
Moss, F. W., 80 John St., N. Y.
- Files and Rasps, Manufacturers of.**  
Arcade File Works, Anderson, Ind.  
Banker & White, Troy, N. Y.  
Barnett, G. & H., 41 & 43 Richmond, Phila.  
McCartrey File Co., Philadelphia.  
Nicholson File Co., Providence, R. I.
- Fire Brick, Makers of.**  
Borgner, Cyrus, Philadelphia, Pa.  
Gardner, Jas. & Son, Cumberland, Md.  
Kreischer, B. & Sons, foot E. Houston St., N. Y.  
Maurer, H. & Son, 420 E. 23d, N. Y.  
Ostrander Fire Brick Co., Troy, N. Y.  
Valentine, M. D. & Bro., Woodbridge.
- Fire Doors.**  
Berlin Iron Bridge Co., E. Berlin, Conn.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Fishing Tackle.**  
Dane, Stoddard & Kendall, Boston, Mass.
- Flat and Emery Paper.**  
Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**  
Eromwell Brush & Wire Goods Co., Cincinnati, Ohio.  
Meyers, Fred. J. Mfg. Co., Hamilton, O.
- Flue Cleaners.**  
Mackey, Jas. T., St. Louis, Mo.
- Fodder Cutters.**  
Silver Mfg. Co., Salem, O.
- Forges, Portable, &c.**  
Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Foos Mfg. Co., Springfield, Ohio.  
Sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Steel-Cambria Iron Co., Johnstown, Pa.  
Frankford Steel Co., Phila., Pa.  
Scranton Forging Co., Scranton, Pa.  
U. S. Projectile Co., Brooklyn, N. Y.
- Forks, Hay and Manure.**  
Iowa Farming Tool Co., Ft. Madison, Iowa
- Foundry Facings.**  
Dixon, Jos., Crucible Co., Jersey City, N. J.  
S. Obermayer Co., Cincinnati, O.  
Smith, J. D., Fdy. Supply Co., Cin., O.
- Foundry Riddles.**  
Estey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**  
Diamond Clamp & Flask Co., Richmond, Ind.  
S. Obermayer Co., Cincinnati, O.  
Rice Mfg. Co., New Durham, N. H.  
Smith, J. D., Fdy. Supply Co., Cin., O.
- Friction Clutches.**  
Brown, A. F., 17 Day St., N. Y.  
Keystone Clutch & Mch. Wks., Phila., Pa.  
Moore & White Co., Philadelphia, Pa.
- Friction Cone.**  
Evans Friction Cone Co., Boston, Mass.
- Furnaces, Foundry.**  
Byram & Co., Detroit, Mich.
- Galvanized Material.**  
Jersey City Galvanizing Co., 112 John St., N. Y.
- Gas Producers.**  
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**  
Pancoast, Henry B. & Co., Phila., Pa.
- Gate Hinges.**  
Wrightsville Hdw. Co., Wrightsville, Pa.
- Gauze, Rolling Mill.**  
Haines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**  
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**  
Boston Gear Works, Boston, Mass.  
Lincoln Iron Works, Rutland, Vt.  
Poole, Robt. & Son Co., Baltimore, Md.  
U. S. Projectile Co., Brooklyn, N. Y.
- Glass Boards.**  
Canton Saw Co., Canton, O.  
Lufkin Rule Co., Saginaw, Mich.
- Glass Cutters.**  
Monce, S. G., Bristol, Conn.
- Glue.**  
Baeder, Adamson & Co., Phila., Pa.  
Dodd, A. W. & Co., Gloucester, Mass.  
Russla Cement Co., Gloucester, Mass.
- Grass Catchers.**  
Supplies Hardware Co., Phila., Pa.
- Grinding Mills.**  
Foos Mfg. Co., Springfield, O.
- Grinding and Polishing Machines.**  
Herrick & Cowell, New Haven, Conn.  
Norton Emery Wheel Co., Worcester, Mass.
- Grindstone Dressing Machinery.**  
Blake & Johnson, Waterbury, Conn.
- Grindstones.**  
Cleveland Stove Co., Cleveland, O.
- Gun Implements.**  
Union Hdw. Co., Torrington, Conn.
- Gunpowder, Makers of.**  
Latta & Chund Powder Co., 29 Murray St., N. Y.
- Hammocks.**  
Eustis, Jas. W. Co., Boston, Mass.
- Handles.**  
Cleveland Wood Turning Co., Cleveland, O.
- Hangers, Door.**  
Chicago Spring Butt Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Lane Bros., Poughkeepsie, N. Y.
- Hardware Comm'n Merchants.**  
Graham, John H. & Co., 111 Chambers St., New York.  
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**  
Stearns, E. C. & Co., Syracuse, N. Y.  
Streeter, N. R. & Co., Groton, N. Y.  
Union Mfg. Co., 103 Chambers, N. Y.  
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs.' Agents.**  
Bingham, W. Co., Cleveland, O.  
Clarke, Thomas, St. John, N. B.  
Graham, John H. & Co., 113 Chambers.  
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Hardware Specialties.**  
Acme Shear Co., Bridgeport, Conn.  
Berger Bros., Philadelphia, Pa.  
Bourke Mfg. Co., Youngstown, O.  
Clark Mfg. Co., Buffalo, N. Y.  
Enterprise Mfg. Co., Philadelphia, Pa.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Gwinner Mfg. Co., Hamilton, O.  
Haines & Zimmerman, Phila., Pa.  
Johnson, S. C., Racine, Wis.
- Harness Snaps.**  
Covert Mfg. Co., West Troy, N. Y.  
Coverts' Saddlery Wks., Farmer, N. Y.  
Fitch, W. & E. T., New Haven, Conn.
- Hog Rings and Ringers.**  
Oakes & Irwin, Decatur, Ill.
- Hoisting Machines.**  
Box, Alfred & Co., 314 Green, Phila.  
Brown Hoisting & Conveying Mch. Co., Cleveland, Ohio.  
Fulton Iron & Engine Wks., Detroit, Mich.  
Harrington, E., Son & Co., Phila.  
Lane Bros., Poughkeepsie, N. Y.  
Lidgerwood Mfg. Co., 96 Liberty, N. Y.  
Lincoln Iron Works, Rutland, Vt.  
McCoy, Jos. F. & Co., 28 Warren St.  
Maris & Beekley, Philadelphia.  
Moore Mfg. & Fdy. Co., Milwaukee, Wis.  
Morse, Williams & Co., Phila.  
Sellers, Wm. & Co., Phila. and N. Y.  
Speidel, J. G., Reading, Pa.  
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**  
Avery Stamping Co., Cleveland, O.  
Bronson Supply Co., Cleveland, Ohio.  
Cleveland Stamping & Tool Co., Cleveland, O.  
Stuart & Peterson Co., Phila., Pa.
- Horse Nails, Makers of.**  
Capewell Horse Nail Co., Hartford, Conn.  
National Horse Nail Co., Vergennes, Vt.  
Putnam Nail Co., Neponset, Boston, Mass.
- Horse and Mule Shoes, Makers of.**  
Bryden Horse Shoe Co., Catsasauqua, Pa.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Diamond State Iron Co., Wilmington, Del.  
Old Dominion Iron & Nail Works Co., Richmond, Va.  
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.  
Rhode Island Perkins Horse Shoe Co., Providence.  
Shoenberger & Co., Pittsburgh, Pa.  
Standard Horse Shoe Co., Boston, Mass.
- Hose Menders.**  
Hudson, C. E. & Co., Leominster, Mass.
- Hose.**  
Cleveland Rubber Works, Cleveland, O.  
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.
- Hydrants, &c.**  
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Forging.**  
U. S. Projectile Co., Brooklyn, N. Y.
- Hydraulic Jacks.**  
Dudgeon, Richard, 24 Columbia, N. Y.  
McCoy, Jos. F. Co., 28 Warren St., N. Y.
- Ice Cream Freezers.**  
North Bros. Mfg. Co., Phila., Pa.  
Packer, C. W., Philadelphia, Pa.  
White Mountain Freezer Co., Nashua, N. H.
- Injectors.**  
Eaton-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., New York.  
Sherwood Mfg. Co., Buffalo, N. Y.
- Insurance, Boiler.**  
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A., 21 Broadway, N. Y.
- Iron Adornment Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lea, J. Tatnall & Co., Philadelphia.  
Mohr, J. J., 430 Walnut, Philadelphia.  
Pilling & Crane, Philadelphia, Pa.  
Wister, L. & R. Co., Phila., Pa.
- Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.
- Iron, Merchants.**  
Bates, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Bussenius & Cunliffe, Philadelphia.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.  
Pierson & Co., 29 Broadway, N. Y.  
Thomson, W. H. & Co., Phila., Pa.  
Wallace, Wm. H. & Co., 66 B'way, N. Y.  
Wintney, A. R. & Co., 17 B'way, N. Y.  
Wilson, E. H. & Co., Philadelphia.
- Iron, Importers.**  
Abbott, Wheelock & Co., N. Y. and Boston.  
Lundberg, Gustaf, Boston, Mass.
- Iron, Sheet, Manufacturers of.**  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Ironwork, Ornamental.**  
Barnum, E. T., Detroit, Mich.  
Champion Iron Co., Kenton, O.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
The Van Dorn Iron Works Co., Cleveland, O.
- Juice Extractors.**  
Sterling Aluminum Co., Brooklyn, N. Y.
- Keys.**  
Wollensak, J. F., Chicago, Ill.
- Ladles.**  
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamps.**  
Standard Lighting Co., Cleveland, O.
- Lanterns.**  
Rochester Lamp Co., 42 Park Place, New York.  
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**  
Dietz, Schumacher & Co., Cincinnati, O.  
Draper Machine Tool Co., Worcester, Mass.  
Harrington, E. Son & Co., Phila., Pa.  
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.  
New Haven Mfg. Co., New Haven, Conn.  
Sebastian Lathe Co., Cincinnati, O.  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**  
Clinton Wire Cloth Co., Clinton, Mass.  
N. J. Wire Cloth Co., Trenton, N. J.  
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Laundry Machines.**  
Johnson, S. C., Racine, Wis.
- Lawn Mowers.**  
Anderson, F. S. & Co., Richmond, Ind.  
Blair Mfg. Co., Springfield, Mass.  
Chadborn & Coldwell Mfg. Co., Newburg, N. Y.  
Coldwell Lawn Mower Co., Newburg, N. Y.  
Dille & McGuire Mfg. Co., Richmond, Ind.  
Enterprise Mfg. Co., Philadelphia, Pa.  
F. & N. Mfg. Co., Richmond, Ind.  
Henley, M. C., Richmond, Ind.  
Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**  
Gibbs Mfg. Co., Canton, Ohio.  
Kohler, F. E. & Co., Canton, O.
- Lawn Sprinklers.**  
Blair Mfg. Co., Springfield, Mass.  
Enterprise Mfg. Co., Phila., Pa.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Gibbs Mfg. Co., Canton, Ohio.  
Graham, John H. & Co., 111 Chambers Street, N. Y.  
McGowan, John H. Co., Cincinnati, O.  
Portland Lawn Sprinkler Co., Portland, Me.
- Lemon Squeezers.**  
Ripley Mfg. Co., Unionville, Conn.
- Letters and Figures, Metallic.**  
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**  
Tablet & Ticket Co., Chicago, Ill.
- Levels.**  
Richardson, C. F. & Son, Athol, Mass.
- Locks and Knobs, Manufacturers of.**  
Deltz, A. E., 97 Chambers, N. Y.  
Independent Electric Co., Chicago, Ill.  
Reading Hdw. Co., Reading, Pa.  
Smith & Egge Mfg. Co., Bridgeport, Conn.  
Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricants.**  
Dixon, Jos., Crucible Co., Jersey City, N. J.
- Machinery.**  
Am. Tool Works, Cleveland, Ohio.  
Ayer, H. C. & Gleason Co., Phila., Pa.  
Barnes, W. F. & John, Rockford, Ill.  
Bement, Miles & Co., Philadelphia, Pa.  
Bigelow, C. E., 45 Dey, N. Y.  
Bigall & Keeler Mfg. Co., St. Louis.  
Bliss, E. W. Co., Brooklyn, N. Y.  
Bridgeport Mch. Tool Works, Bridgeport, Conn.  
Briggs, Marvin, 12 Broadway, N. Y.  
Carlin's Sons, Thos., Allegheny, Pa.  
Ciapp, Geo. M., agt. 74 Cortlandt, N. Y.  
Detrick & Harvey Mch. Co., Baltimore, Md.  
Dietz, Schumacher & Co., Cincinnati, Ohio.  
Fitchburg Mch. Works, Fitchburg, Mass.  
Garvin Mch. Co., Laight & Canal Sts.  
Gould & Eberhardt, Newark, N. J.  
Hamilton Mch. Tool Co., Hamilton, O.  
Harrington, E. Son & Co., Phila., Pa.  
Henderer, A. L., Wilmington, Del.  
Hendey Machine Co., Torrington, Ct.  
Hill, Clarke & Co., Boston, Mass.  
Howard & Morse, 145 Fulton St., N. Y.  
Hulburt-Rogers Mch. Co., South Sudbury, Mass.  
Johnson, Israel H., Jr., & Co., Phila.  
Jones & Lamson Mch. Co., Springfield, Vt.  
Lodge & Davis Mch. Tool Co., Cincinnati, O.  
Lodge & Shipley Mch. Tool Co., Cincinnati, O.  
Lovegrove & Co., Philadelphia, Pa.  
McCabe, J. J., 68 Cortlandt, N. Y.  
Machinery's Supply Co., Rochester, N. Y.  
Manville, E. J., Mch. Co., Waterbury, Conn.  
Newark Mch. Tool Wks., Newark, N. J.  
New Haven Mfg. Co., New Haven, Ct.  
New York Machinery Depot, 178 Broadway, New York.  
Niles Tool Wks., 138 Liberty St., N. Y.  
Pittsburgh Mfg. Co., Pittsburgh, Pa.

- Place, Geo.**, 145 Broadway, N. Y.  
**Poole, Robt. & Son Co.**, Baltimore, Md.  
**Powell Planer Co.**, Worcester, Mass.  
**Pratt & Whitney Co.**, Hartford, Conn.  
**Prentiss Tool & Supply Co.**, N. Y.  
**Scranton Supply & Mchry. Co.**, Scranton, Pa.  
**Sellers, Wm. & Co.**, Phila.  
**Seyfert's Sons, L. F.**, Philadelphia, Pa.  
**Signourney Tool Co.**, Hartford, Conn.  
**Stoeptoe, J. & Co.**, Cincinnati, O.  
**Stow Flexible Shaft Co. Ltd.**, Phila.  
**Toomey, Frank**, Philadelphia, Pa.  
**Walker Mfg. Co.**, Cleveland, O.  
**Wetherill, Robert & Co.**, Chester, Pa.  
**Wickes Bros.**, Saginaw, Mich.  
**Wilson, W. A.**, Rochester, N. Y.
- Machinery for Hardware Manufacturers.**  
 Add. Jno. & Son, New Haven, Conn.
- Machine Knives.**  
**Loring, Coes & Co.**, Worcester, Mass.  
**Loyd, John**, 558-562 Water St., N. Y.  
**Simonds Mfg. Co.**, Fitchburg, Mass.  
**New Britain Hdw. Mfg. Co.**, New Britain, Conn.
- Machine Tools.—See Machinery.**
- Machine Work.**  
**Fapping, J.**, 86th St. & 11th Ave., N. Y. City.
- Machinists' Scales.**  
**Coffin & Leighton**, Syracuse, N. Y.  
**Starrett, L. S.**, Athol, Mass.
- Machinists' Tools and Supplies.**  
**King, J. M. & Co.**, Watertown, N. Y.  
**Sellers, Wm. & Co., Inc.**, Phila.
- Mangles.**  
**Johnson, S. C.**, Racine, Wis.
- Manufacturing Sites.**  
**Illinois Central R. R.**, Chicago, Ill.
- Measuring Tapes.**  
**Keuffel & Esser Co.**, N. Y.  
**Lufkin Rule Co.**, Saginaw, Mich.
- Meat Choppers.**  
**Clauss Shear Co.**, Fremont, Ohio.
- Mechanical Instruction.**  
**Correspondence School of Mechanics**, Scranton, Pa.  
**Rose Polytechnic Institute**, Terre Haute, Ind.
- Metals.**  
**Fearing, Wm. S.**, 100 Chambers, N. Y.  
**Hendricks Bros.**, 49 Cliff, N. Y.
- Metal Brokers.**  
**American Metal Co.**, N. Y.
- Metallurgists.**  
**Britton, J. Blodgett**, Phila., Pa.
- Mincing Knives.**  
**Palmer Hdw. Mfg. Co.**, Troy, N. Y.
- Mine Lamps.**  
**Darby, Edw. & Sons**, Phila., Pa.  
**Leonard, B. E.**, Scranton, Pa.
- Mining Screens.**  
**Harrington & King Perforating Co.**, Chicago, Ill.  
**Howard & Morse**, 45 Fulton, N. Y.
- Models, Makers of.**  
**Franklin, H. H. Mfg. Co.**, Syracuse, N. Y.  
**Ideal Machine Works**, Hartford, Conn.
- Molding Sand.**  
**Overmayer, S. Co.**, Cincinnati, O.
- Money Drawers.**  
**Columbian Novelty Co.**, North East, Penna.  
**Sun Mfg. Co.**, Greenfield, Ohio.  
**Wadell, Wooden Ware Wks.**, Greenfield, Ohio.
- Motors, Water and Electric.**  
**Bolgiano Mfg. Co.**, Baltimore, Md.  
**C. & C. Electric Co.**, 402 and 404 Greenwich St., N. Y.  
**Dallett, Thomas H. & Co.**, Phila., Pa.
- Nail Keg Stock.**  
**Crescent Mfg. Co.**, Detroit, Mich.
- Nail Machinery.**  
**Pittsburgh Mfg. Co.**, Pittsburgh, Pa.
- Nail and Tack Pullers.**  
**Scranton & Co.**, New Haven, Conn.  
**Specialty Mfg. Co.**, Hartford, Conn.
- Nails (Cut) and Spikes.**  
**Borden & Lovell**, 70 West, N. Y.  
**Pottstown Iron Co.**, Pottstown, Pa.  
**Riverside Iron Wks.**, Wheeling, W. Va.  
**Valley Steel Co.**, St. Louis, Mo.
- Nickel Plating Supplies.**  
**Eddy Electric Mfg. Co.**, Windsor, Conn.  
**Banson & Van Winkle Co.**, Newark, N. J.  
**Zucker & Levett Chemical Co.**, 10 to 14 Grand St., N. Y.
- Nickel Plating.**  
**Rhodes, L. E. Co.**, Hartford, Conn.
- Norway Shapes, Rollers of.**  
**Rowland, William & Harvey**, Frankford, Philadelphia.
- Novelty Manufacturers.**  
**Franklin, H. H. Mfg. Co.**, Syracuse, N. Y.  
**Ideal Machine Works**, Hartford, Conn.
- Nut Machines.**  
**Dunham Nut Co.**, Unionville, Ct.
- Nuts, Bolts, &c., Makers of.**  
**American Bolt Co.**, Lowell, Mass.  
**American Screw Co.**, Providence, R. I.  
**Blake & Johnson**, Waterbury, Conn.  
**Dunham Nut Co.**, Unionville, Conn.  
**Haskell, Wm. H. Co.**, Pawtucket, R. I.  
**Mt. Carmel Bolt Co.**, Mt. Carmel, Conn.  
**Pennsylvania Bolt & Nut Co.**, Lebanon, Pa.  
**Port Chester Bolt & Nut Co.**, Port Chester, N. Y.  
**Russell, Burdall & Ward**, Port Chester, N. Y.  
**Sternbergh, J. H. & Son**, Reading, Pa.  
**Wilson, J. Fred.**, Worcester, Mass.  
**Wm. H. Haskell Co.**, Pawtucket, R. I.
- Oil Cups and Lubricator.**  
**Sherwood Mfg. Co.**, Buffalo, N. Y.
- Oilers.**  
**Wilnot & Hobbs Mfg. Co.**, Bridgeport, Conn.
- Oil Stones.**  
**Pike Mfg. Co.**, Pike Station, N. H.
- Ores.**  
**Wister, Francis**, Philadelphia, Pa.
- Ox Shoes.**  
**Scranton Forging Co.**, Scranton, Pa.
- Packing.**  
**Morrison, Robert**, St. Louis, Mo.  
**N. Y. Belting & Packing Co. Ltd.**, N. Y.
- Padlocks.**  
**Ames Sword Co.**, Chicopee, Mass.  
**Fralm, E. T.**, Lancaster, Pa.  
**Independent Electric Co.**, Chicago, Ill.  
**Shutze Mfg. Co.**, Phila., Pa.  
**Wolf, W. & L.**, Phila., Pa.
- Paint.**  
**Garry Iron & Steel Roofing Co.**, Cleveland, O.
- Paint Burners.**  
**Dangler Stove & Mfg. Co.**, Cleveland, Ohio.
- Paint Cans.**  
**Wilnot & Hobbs Mfg. Co.**, Bridgeport, Conn.
- Pants Stretcher.**  
**Covert Mfg. Co.**, West Troy, N. Y.
- Patent Solicitors.**  
**Butler, C. N.**, Phila., Pa.  
**Jenner, H. W. T.**, Washington, D. C.  
**Howson & Howson**, Philadelphia and Washington.  
**Stocking, E. B.**, Washington, D. C.
- Pattern Letters.**  
**Wells, Heber**, 157 William St., N. Y.
- Perforating Metal.**  
**Clinton Wire Cloth Co.**, Clinton, Mass.  
**Harrington & King Perforating Co.**, Chicago, Ill.  
**Hendrick Mfg. Co., Ltd.**, Carbondale, Pa.
- Phosphor Bronze.**  
**Phosphor Bronze Smelting Co.**, Limited, Philadelphia.
- Phosphor Tin.**  
**Crescent Phosphorized Metal Co.**, Philadelphia, Pa.  
**Halk & Naumann**, 516 Pearl, N. Y.
- Picks and Mattocks.**  
**Plumb, Fayette R.**, Philadelphia, Pa.
- Pig Iron.**  
**Houston, C. B. & Co.**, Philadelphia, Pa.  
**Montour Iron & Steel Co.**, Danville, Pa.  
**Naylor & Co.**, 45 Wall, N. Y.  
**Pilling & Crane**, Philadelphia, Pa.  
**Samuel, Frank**, Philadelphia, Pa.
- Pig Iron Storage.**  
**Am. Pig Iron Storage Warrant Co.**, 44 Wall, N. Y.
- Pile Drivers.**  
**Vulcan Iron Works**, Chicago, Ill.
- Pipe Bent.**  
**National Pipe Bending Co.**, New Haven, Conn.
- Pipe Cutting and Threading Machines.**  
**Armstrong Mfg. Co.**, Bridgeport, Conn.  
**Bignall & Keeler Mfg. Co.**, St. Louis, Mo.  
**Derrick & Harvey Mch. Co.**, Baltimore, Md.  
**Merrill Mfg. Co.**, Toledo, O.  
**Pancoast, Henry B. & Co.**, Phila.  
**Saunders' Sons, D.**, Yonkers, N. Y.  
**Walworth Mfg. Co.**, Boston, Mass.
- Pipe Grips.**  
**Prentiss Vise Co.**, 44 Barclay, N. Y.
- Pipes, Fittings, &c., Makers of.**  
**McNab & Harlin Mfg. Co.**, N. Y.
- Pipe, Water and Gas, Makers of.**  
**Donaldson Iron Co.**, Emaus, Pa.  
**Riverside Iron Works**, Wheeling, W. Va.  
**Wood, R. D. & Co.**, Philadelphia, Pa.
- Plane Irons, Manufacturers of.**  
**Buck Bros.**, Millbury, Mass.  
**Buck, Chas.**, Millbury, Mass.
- Planers.**  
**Derrick & Harvey Mch. Co.**, Baltimore, Md.  
**New Haven Mfg. Co.**, New Haven, Conn.  
**Powell Planer Co.**, Worcester, Mass.  
**Wilson, W. A.**, Worcester, Mass.
- Planes, Manufacturers of.**  
**Stanley Rule & Level Co.**, N. Y.
- Plated Ware.**  
**Boardman, L. & Son**, New Haddam, Ct.  
**Hobbes & Edwards Silver Co.**, Bridgeport, Conn.  
**Rogers, Wm. Mfg. Co.**, Hartford, Ct.
- Plate, Iron and Steel, Mfrs. of.**  
**Albion Standard Iron & Steel Co.**, Bridgeport, O.  
**Lukens Iron & Steel Co.**, Coatesville, Pa.  
**Mahoning Valley Iron Co.**, Youngstown, Ohio.  
**Moorhead-McLean Co.**, Pittsburgh, Pa.  
**Melvin & Sons**, Reading, Pa.  
**Pottstown Iron Co.**, Pottstown, Pa.  
**Pottsville Iron & Steel Co.**, Pottsville, Pa.  
**Singer, Nimick & Co.**, Pittsburgh, Pa.  
**The Mahoning Valley Iron Co.**, Youngstown, O.  
**Wood, Alan Co.**, Philadelphia.
- Plating, Nickel, Brass and Silver.**  
**Wilnot & Hobbs Mfg. Co.**, Bridgeport, Conn.
- Polishing Machines.**  
**Watson & Stillman**, 201 E. 43d, N. Y.
- Post Hole Diggers.**  
**Gibbs Mfg. Co.**, Canton, Ohio.  
**Kohler, F. E. & Co.**, Canton, O.
- Poultry Nestings.**  
**Barum, E. T.**, Detroit, Mich.  
**Gilbert & Bennett Mfg. Co.**, 42 Cliff St., N. Y.  
**N. J. Wire Cloth Co.**, Trenton, N. J.  
**Silver Finish.**  
**Tyler Wire Works Co.**, W. S., Cleveland, O.  
**Wright & Colton Wire Cloth Co.**, Worcester, Mass.
- Powder.**  
**Lafin & Rand Powder Co.**, 29 Murray, N. Y.  
**New York Powder Co.**, 62 Liberty St., N. Y.
- Power Hack Saws.**  
**Millers Falls Co.**, 93 Reade St., N. Y.
- Power Hammers.**  
**Dienelt & Eisenhardt**, Philadelphia.  
**Dupont Mfg. Co.**, St. Johnsbury, Vt.  
**Jenkins & Lingle**, Bellefonte, Pa.  
**Scranton & Co.**, New Haven, Conn.
- Power Transmitting Machinery.**  
**Dodge Mfg. Co.**, Mishawaka, Ind.
- Presses, Dies, &c.**  
**E. W. Bliss Co.**, Brooklyn, N. Y.  
**Crosby, G. A. & Co.**, Chicago, Ill.  
**Ferracute Mch. Co.**, Bridgeton, N. J.  
**Stark Mch. & Tool Co.**, Buffalo, N. Y.  
**Stiles & Parker Press Co.**, Brooklyn, N. Y.  
**Waterbury Mch. Co.**, Waterbury, Ct.
- Presses, Power, Makers of.**  
**Bliss, E. W. Co.**, Brooklyn, N. Y.  
**Manville, E. J. Mch. Co.**, Waterbury, Ct.  
**Stark Mch. & Tool Co.**, Buffalo, N. Y.  
**Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn.
- Printers.**  
**Griffith, Axtell & Cady Co.**, Holyoke, Mass.
- Pulleys.**  
**Brown, A. & F.**, 17 Dey St., N. Y.  
**Dodge Mfg. Co.**, Mishawaka, Ind.  
**Keystone Clutch Mch. Wks.**, Phila., Pa.  
**Lake, J. H. & D. Co.**, Massillon, O.  
**Reeves Pulley Co.**, Columbus, Ind.
- Pulverizing Mills.**  
**Bradley Fertilizer Co.**, Boston, Mass.
- Pumping Machinery.**  
**Dean Bros. Steam Pump Works**, Indianapolis, Ind.  
**Goulds Mfg. Co.**, Seneca Falls, N. Y.  
**Hooker-Colville Steam Pump Co.**, St. Louis, Mo.  
**Lucas, C. C. & Co.**, Greenville, Ohio.  
**McGowan, J. H. & Co.**, Cincinnati, O.  
**Maslin, J. & Son**, Jersey City, N. J.  
**Norwalk Iron Works Co.**, So. Norwalk, Conn.  
**Southwark Fdy. & Mch. Co.**, Phila., Pa.  
**Valley Pump Works**, Easthampton, Worthington, Henry R., 86 and 88 Liberty St., N. Y.
- Pumps, Makers of.**  
**Bellevue Pump Co.**, Bellevue, Iowa.  
**Deming Co.**, Salem, O.  
**Douglas, W. & B.**, Middletown, Conn.  
**Goulds Mfg. Co.**, Seneca Falls, N. Y.  
**Myers, F. E. & Bro.**, Ashland, O.
- Punches.**  
**Richards, I. P.**, Providence, R. I.
- Punches and Shears, Hand and Power.**  
**E. W. Bliss Co.**, Brooklyn, N. Y.  
**Crosby, G. A. & Co.**, Chicago, Ill.  
**Ferracute Mch. Co.**, Bridgeton, N. J.  
**Henderer, A. L.**, Wilmington, Del.  
**Stark Mch. & Tool Co.**, Buffalo, N. Y.  
**Stiles & Parker Press Co.**, Brooklyn, N. Y.  
**Wals & Roos Punch & Shear Co.**, Cincinnati, Ohio.  
**Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn.  
**Watson & Stillman**, 201 E. 43d, N. Y.
- Rails, Old and New.**  
**Perry, W. H. & Co.**, Providence, R. I.
- Rat and Mouse Traps.**  
**Estey, W. S.**, 65 Fulton, N. Y.  
**Ripley Mfg. Co.**, Unionville, Conn.
- Razor Guard.**  
**Murphy, P. D.**, Lockport, N. Y.
- Razor Sharpener.**  
**Rozierne Mfg. Co.**, 2 W. 14th St., N. Y.  
**Dame, Stoddard & Kendall**, Boston, Mass.
- Razor Straps.**  
**Torrey J. R. & Co.**, Worcester, Mass.
- Reels.**  
**Hendryx, A. B. Co.**, New Haven, Conn.
- Refrigerator Door Fasteners.**  
**Conroy, P. J. & Co.**, Philadelphia.
- Rivers.**  
**Blake & Johnson**, Waterbury, Conn.  
**Boyce Rivet Co.**, Muncie, Ind.  
**Burden Iron Co.**, Troy, N. Y.  
**Clark & Cowles**, Plainville, Conn.  
**Cobb & Drew**, Plymouth, Mass.  
**New England Screw Co.**, Boston, Mass.  
**Sternbergh, J. H. & Son**, Reading, Pa.  
**Townsend, W. P. & Co.**, New Brighton, Pa.
- Riveting Machines.**  
**Add. Jno. & Sons**, New Haven, Conn.
- Rolling Mill Machinery.**  
**Birmingham Iron Fdry.**, Birmingham, Conn.  
**Booth, The Lloyd Co.**, Youngstown, O.  
**Leeburg Foundry & Mch. Co.**, Pittsburgh, Pa.  
**Morgan Construction Co.**, Worcester, Mass.  
**Robinson-Rea Mfg. Co.**, Pittsburgh.  
**Totten & Hogg Iron and Steel Fdry. Co.**, Pittsburgh, Pa.  
**Trethewey Mfg. Co.**, Pittsburgh, Pa.  
**Waterbury Farrel Foundry & Mch. Co.**, Waterbury, Conn.
- Rolls, Chilled, Sand and Steel.**  
**Birmingham Iron Foundry**, Birmingham, C. n.  
**Booth, The Lloyd Co.**, Youngstown, O.  
**East Chicago Fdy Co.**, Chicago, Ill.  
**Garrison, A. Fdy. Co.**, Pittsburgh, Pa.  
**Robinson-Rea Mfg. Co.**, Pittsburgh, Pa.  
**Seaman, Sleeth & Black**, Pittsburgh.  
**Totten & Hogg Iron and Steel Fdry. Co.**, Pittsburgh, Pa.
- Roofing.**  
**Berlin Iron Bridge Co.**, E. Berlin, Conn.  
**Cambridge Roofing Co.**, Cambridge, O.  
**Cincinnati Corrugating Co.**, Piqua, O.  
**Kanneberg Roofing Co.**, Canton, O.  
**N. Y. Iron Roofing & Corrugating Co.**, Jersey City, N. J.
- Rope and Web Goods.**  
**Covert Mfg. Co.**, West Troy, N. Y.  
**Covert's Saddlery Wks.**, Farmer, N. Y.
- Rope Wheels.**  
**Cresson, Geo. V. Co.**, Philadelphia, Pa.
- Rubber Goods.**  
**Canfield, H. O.**, Bridgeport, Conn.
- Rules, Manufacturers of.**  
**Keuffel & Esser Co.**, New York.  
**Lufkin Rule Co.**, Saginaw, Mich.  
**Stanley Rule & Level Co.**, 29 Chambers, N. Y.
- Rust Preventive.**  
**Bridgeport Gun Implement Co.**, 313-315 Broadway, N. Y.
- Sad Irons.**  
**Streeter, N. R. & Co.**, Groton, N. Y.
- Sad Irons, Gas.**  
**Bolgiano Mfg. Co.**, Baltimore, Md.
- Sand Paper.**  
**Baeder, Adamson & Co.**, Phila., Pa.
- Sash Balances.**  
**Caldwell Mfg. Co.**, Rochester, N. Y.  
**Pullman Sash Balance Co.**, Rochester, N. Y.
- Sash Cords and Chains.**  
**Morton, Thos.**, 75 Elizabeth, N. Y.  
**Ossawan Mills Co.**, Norwich, Conn.  
**Samson Cordage Works**, Boston, Mass.  
**Smith & Egge Mfg. Co.**, Bridgeport, Mass.
- Sash Locks.**  
**Columbian Sash & Door Lock Co.**, Wauseon, Ohio.
- Sash Pulleys.**  
**Palmer Hardware Mfg. Co.**, Troy, N. Y.
- Sash Weights.**  
**Brown, E. E. & Co.**, Philadelphia, Pa.  
**Norton Bros.**, Chicago, Ill.
- Saw Filing Machines.**  
**Disston, Henry & Sons**, Philadelphia, Pa.
- Saws, Makers of.**  
**Butler Mfg. Co.**, Boston, Mass.  
**Disston, Henry & Sons**, Phila., Pa.  
**National Saw Co.**, 96 Reade St., N. Y.  
**Simonds Mfg. Co.**, Fitchburg, Mass.
- Saw Vises.**  
**Seneca Falls Mfg. Co.**, Seneca Falls, N. Y.
- Saw Sets.**  
**Taintor Mfg. Co.**, 84-86 Chambers, N. Y.
- Scales, Manufacturers of.**  
**Buffalo Scale Co.**, Buffalo, N. Y.  
**Chatillon, John & Sons**, 85-89 Cliff, N. Y.
- Scrapers, Road.**  
**Am. Steel Scraper Co.**, Sydney, Ohio.  
**Kilbourne & Jacobs Mfg. Co.**, Columbus, O.  
**Sidney Steel Scraper Co.**, Sidney, O.
- Screens, Coal and Ore.**  
**Hendrick Mfg. Co., Ltd.**, Carbondale, Pa.
- Screens, Door and Window.**  
**White, Van Gahn & Co.**, 15-17 Chatham Sq., N. Y.
- Screw Cutting Machinery.**  
**Wells Bros. & Co.**, Greenfield, Mass.  
**Wiley & Russell Mfg. Co.**, Greenfield, Mass.
- Screw Drivers.**  
**Brown, R. H. & Co.**, New Haven, Conn.  
**Mayhew, H. H. Co.**, Shelburne Falls, Mass.
- Screw Plate and Pipe Cutter.**  
**Jarecki Mfg. Co.**, Erie, Pa.
- Screws, Makers of.**  
**American Screw Co.**, Providence, R. I.  
**Blake & Johnson**, Waterbury, Conn.  
**Wm. H. Haskell Co.**, Pawtucket, Miles, F. S., 205 Quarry, Philadelphia.  
**New England Screw Co.**, Boston, Mass.  
**Reynolds & Co.**, New Haven, Conn.  
**Worcester Machine Screw Co.**, Worcester, Mass.
- Scroll Saws.**  
**Barnes, W. F. & John**, Rockford, Ill.  
**Seneca Falls Mfg. Co.**, Seneca Falls, N. Y.
- Seythe Stones and Whetstones.**  
**Pike Mfg. Co.**, Pike Station, N. H.  
**Cleveland Stone Co.**, Cleveland, O.
- Sewing Machines.**  
**Household Sewing Machine Co.**, Chicago, Ill.
- Shaft Coupling.**  
**Columbian Novelty Co.**, North East, Penna.
- Shafting, Makers of.**  
**Brown, A. & F.**, 17 Dey St., N. Y.  
**Cresson, Geo. V. Co.**, Philadelphia, Pa.  
**Fairmount Mch. Co.**, Philadelphia, Pa.  
**Sellers, Wm. & Co., Inc.**, Phila., Pa.  
**Stow Mfg. Co.**, Binghamton, N. Y.
- Shaft Support.**  
**DeVatur Shaft Support Co.**, Decatur, Ill.
- Shaped Iron and Steel, Manufacturers of.**  
**Etna-Standard Iron & Steel Co.**, Bridgeport, O.  
**East Chicago Fdy Co.**, Chicago, Ill.

- Allentown Rolling Mill.** Allentown, Pa.  
Lockhart Iron & Steel Co., Pittsburgh, Pa.
- Passaic Rolling Mill Co., Paterson, N.J.**  
Pottsville Iron & Steel Co., Pottsville, Pa.
- Roberts, A. & P. & Co., Phila., Pa.**  
The Phoenix Iron Co., Phila., Pa.
- Shears and Scissors.**  
Ame Shear Co., Bridgeport, Conn.  
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**  
Etna-Standard Iron and Steel Co., Bridgeport, O.  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
Chess Bros., Pittsburgh, Pa.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Mahoning Valley Iron Co., Livingston, Ohio.  
Morehead-McCleane Co., Pittsburgh.  
Pierson & Co., 29 Broadway, N. Y.  
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.  
The Mahoning Valley Iron Co., Youngstown, O.  
Alan Wood Co., Philadelphia.  
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Zinc.**  
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Show Cases.**  
Union Show Case Co., Chicago, Ill.
- Sinks.**  
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**  
Keene Mfg. Co., Keene, N. H.  
Winslow, Sam'l. Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**  
Henley, M. C., Richmond, Ind.  
Union Hardware Co., Torrington, Ct.  
Winslow, Sam'l., Skate Mfg. Co., Worcester, Mass.
- Slag Machines.**  
Cambria Iron Co., Johnstown, Pa.
- Smelting Works.**  
Reeves, Paul S., 760 S. Broad, Phila.
- Soldering Coppers.**  
Clendenin Bros., Baltimore, Md.  
Covert Mfg. Co., West Troy, N. Y.
- Soldering Furnaces.**  
Burgess Soldering Furnace Co., Columbus, Ohio.
- Speaking Tubes.**  
Ostrander, W. R. & Co., 204 Fulton St. N. Y.  
Wollensak, J. F., Chicago, Ill.
- Spelter.**  
Matthiessen & Hegeler Zinc Co., La Salle, Ill.  
Missouri Metal Co., St. Louis, Mo.
- Spoons and Forks.**  
Boardman, L. & Son, New Haddam, Conn.  
Holmes & Edwards Silver Co., Bridgeport, Conn.  
Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**  
Hartley & Graham, 313-315 B'way, N. Y.
- Springs.**  
Clark & Cowles, Plainville, Ct.  
Coiled Wire Belting Co., Jersey City, N. J.  
Dunbar Bros., Bristol, Conn.  
Miller & Van Winkle, Brooklyn, N. Y.  
Morgan Spring Co., Worcester, Mass.  
Roland, Wm. & Harvey, Phila., Pa.  
Sabin Machine Co., Montpelier, Vt.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**  
Bommer Bros., Brooklyn, N. Y.  
Chicago Spring Butt Co., Chicago, Ill.  
Pullman Sash Balance Co., Rochester, N. Y.  
Stover Mfg. Co., Freeport, Ill.  
Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.
- Stamped Ware.**  
Am. Stamping Co., 104 & 106 John St., New York.
- Stamping Works.**  
Avery Stamping Co., Cleveland, O.  
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**  
Cobb & Drew, Plymouth, Mass.  
Titchener, E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**  
Bristol Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**  
Dienelt & Eisenhardt, Philadelphia.  
Dudgeon, Richard, 24 Columbia Street, N. Y.  
Tretbaway Mfg. Co., Pittsburgh, Pa.
- Steam Heating & Oil Separators.**  
Webster, Warren & Co., Camden, N. J.
- Steam Separators.**  
Goubert Mfg. Co., 32 Cortlandt St., N. Y.  
Harrison Safety Boiler Wks., Phila., Pa.  
Webster, Warren & Co., Camden, N. J.
- Steam Specialties.**  
Lukenheimer Co., Cincinnati, O.
- Steel, Cold Rolled Strip.**  
Superior Steel Co., Pittsburgh, Pa.  
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**  
Krogstad, W., 61 Fulton St., N. Y.
- Steel Importers.**  
Abbott, Wheelock & Co., N. Y. and Boston.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.  
Milne, A. & Co., 1 Broadway, N. Y.  
Newton & Shipman, 83 John, N. Y.  
Wetherell Bros., 93 Liberty St., N. Y.  
Whitney, A. R. & Co., B'way, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**  
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**  
Etna-Standard Iron & Steel Co., Bridgeport, O.  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Baker, Hermann & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.  
Chester Steel Castings Co., Phila., Pa.  
Chrome Steel Works, Brooklyn, N. Y.  
Crescent Steel Co., Pittsburgh, Pa.  
Frankford Steel Co., Philadelphia.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.  
Kayser, Ellison & Co., Sheffield, Eng.  
La Belle Steel Co., Pittsburgh, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Morehead-McCleane Co., Pittsburgh, Pa.  
Moss, F. W., 83 John, N. Y.  
Pottsville Iron and Steel Co., Pottsville, Pa.  
Bowland, Wm. & Harvey, Frankford, Philadelphia.  
Singer, Nimick & Co., Pittsburgh, Pa.  
Superior Steel Co., Pittsburgh, Pa.  
Wordlaw, S. & C., Sheffield, Eng.  
Wetherell Bros., 93 Liberty, N. Y.  
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.  
Valley Steel Co., St. Louis, Mo.
- Steel, Manufacturers' Agents.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Lindsay, Jas. G. & Co., Phila., Pa.  
Pierson & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Iron Co., Johnstown, Pa.  
Montour Iron & Steel Co., Danville, Pa.  
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**  
Frankford Steel Co., Philadelphia, Pa.  
Jessop, Wm. & Sons, Sheffield, England, 91 John, N. Y.  
Jones, B. M. & Co., Boston, Mass.  
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders, Rolling.**  
Bicycle Step Ladder Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Croissant, M. Albany, N. Y.  
Morley Bros., Saginaw, Mich.
- Stocks and Dies.**  
Armstrong Mfg. Co., Bridgeport, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Butterfield & Co., Derby Line, Vt.  
Hart Mfg. Co., Cleveland, O.  
Oster Mfg. Co., Cleveland, O.  
Saunders' Sons, D., Yonkers, N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stone Saws and Planers.**  
Lincoln Iron Works, Rutland, Vt.
- Stove Linings.**  
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**  
Cheney, S. & Son, Manlius, N. Y.
- Stove Trucks.**  
Gwinner Mfg. Co., Hamilton, Ohio.
- Stoves, Gasoline.**  
Standard Lighting Co., Cleveland, O.
- Street Lamps.**  
Rochester Lamp Co., 42 Park Place, New York.  
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Structural Iron Work.**  
Berlin Iron Bridge Co., East Berlin, Conn.  
Lindsay, Jas. G. & Co., Phila., Pa.
- Sulphuric Acid.**  
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**  
Atlas Tack Corporation, Boston, Mass.  
Clendenin Bros., Baltimore, Md.  
Cobb & Drew, Plymouth, Mass.  
Grand Crossing Tack Co., Grand Crossing, Ill.
- Taps and Dies.**  
Butterfield & Co., Derby Line, Vt.  
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.  
Manning, Maxwell & Moore, 111 Liberty St., N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**  
Riehle Bros. Testing Mach. Co., Philadelphia.
- Testing Machines.**  
Riehle Bros. Testing Mach. Co., Phila.
- Theatrical Hardware.**  
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**  
Frost Thill Spring Co., Boston, Mass.  
Sabin Machine Co., Montpelier, Vt.
- Thrust Collars.**  
Gouverneur Mach. Co., Gouverneur, N. Y.
- Timber and Mineral Lands.**  
Robertson, E. Co., Cincinnati, O.
- Time Record.**  
Scattergood, H. W., Phila., Pa.
- Tin Plate Machinery.**  
Lloyd Booth Co., Youngstown, Ohio.
- Tinware.**  
Am. Stamping Co., 104 & 106 John St.
- Tire Upsetters.**  
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**  
Burke, P. F., Boston, Mass.
- Tool Blocks.**  
Hubb-Rogers Mch. Co., South Sudbury, Mass.
- Tool Chests.**  
Am. Tool Co., 200 W. Houston St., N. Y.
- Tool Holders.**  
Armstrong Bros. Tool Co., Chicago, Ill.
- Tools.**  
Britton, Horace E., Stoughton, Mass.  
Brown, R. H. & Co., New Haven, Conn.  
Hogson & Pettis Mfg. Co., New Haven, Conn.  
Mayhew, H. H. Co., Shelburne Falls, Mass.  
Millers Falls Co., 93 Reade, N. Y.  
Richardson, C. F. & Son, Athol, Mass.  
Standard Tool Co., Athol, Mass.  
Stanley Rule & Level Co., 29 Chambers.  
Starrrett, J. S., Athol, Mass.  
Stevens, J. S. Arms & Tool Co., Chicopee Falls, Mass.  
Tower & Lyon, 95 Chambers St., N. Y.  
Wilkinson, A. J. & Co., Boston, Mass.
- Tools, Blacksmith and Wheelwright.**  
Buffalo Forge Co., Buffalo, N. Y.  
Butts & Ordway, Boston, Mass.  
Champion Blower & Forge Co., Lancaster, Pa.  
Plumb, Fayette R., Philadelphia, Pa.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.**  
Saunders' Sons, D., Yonkers, N. Y.
- Tools, Tinner's.**  
Peerless Cooker Co., Buffalo, N. Y.
- Torches, Oil and Gasoline.**  
Argyle Stove & Mfg. Co., Cleveland, O.  
Schneider & Trenkamp Co., Cleveland, Ohio.
- Transom Lifters.**  
Wollensak, J. F., Chicago, Ill.
- Trucks, Manufacturers of.**  
Clark, G. P., Windsor Locks, Conn.
- Tubes, Seamless Drawn Copper.**  
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**  
Am. Stamping Co., Cleveland, O.  
Lang's, John S. Son & Co., 4 Fletcher St., New York.  
Shelby Steel Tube Co., Shelby, Ohio.  
U. S. Projectile Co., Brooklyn, N. Y.
- Tumbling Barrels.**  
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**  
Cleveland City Forge & Iron Co., Cleveland, O.  
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**  
Cleveland Twist Drill Co., Cleveland.  
Morse Twist Drill & Machine Co., New Bedford, Mass.  
New Process Twist Drill Co., Taunton, Mass.  
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**  
Chapman Valve Mfg. Co., Boston.  
Innon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., 71 John, N. Y.  
Lukenheimer Co., Cincinnati, O.  
McNab & Harlin Mfg. Co., 56 John, N. Y.
- Ventilating Fans.**  
Huyett & Smith Mfg. Co., Detroit, Mich.
- Ventilator Appliances.**  
Howard & Morse, 45 Fulton St., N. Y.
- Vise Jaws.**  
Newark Mch. Tool Co., Newark, N. J.
- Vises.**  
Hollands Mfg. Co., Erie, Pa.  
Howard Iron Works, Buffalo, N. Y.  
Millers Falls Co., 93 Reade St., N. Y.  
Prentiss Vise Co., 44 Barclay, N. Y.  
Tower & Lyon, 95 Chambers St., N. Y.
- Wagon Jacks.**  
Covert Mfg. Co., West Troy, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.
- Washboards.**  
Olds Wagon Wks., Ft. Wayne, Ind.
- Washers.**  
Haskell, Wm. H. Co., Pawtucket, R. I.  
Milton Mfg. Co., Milton, Pa.  
Sternberg, J. H. & Son, Reading, Pa.
- Washing Machines.**  
Benbow Mfg. Co., St. Louis, Mo.  
Diether & Barrows, Ft. Wayne, Ind.  
Wayne, Anthony Mfg. Co., Ft. Wayne, Ind.
- Watches.**  
Ingersoll, R. H. & Bro., 65 Cortlandt St., N. Y.
- Water Meters.**  
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**  
Poole, Robt. & Son Co., Baltimore, Md.
- Wheelbarrows.**  
Amer. Steel Scraper Co., Sidney, Ohio.  
Bryan Mfg. Co., Bryan, Ohio.  
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.  
Sidney Steel Scraper Co., Sidney, O.  
Toledo Wheelbarrow Wks., Toledo, O.
- Window Cleaners.**  
Bourke Mfg. Co., Youngstown, O.
- Window Cord, Makers of.**  
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Miller & Van Winkle, Brooklyn, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
New Haven Wire Mfg. Co., New Haven, Conn.  
Salem Wire Nail Co., Salem, O.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester.  
Wetherell Bros., 93 Liberty St., N. Y.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**  
Barnum, E. T., Detroit, Mich.  
Clinton Wire Cloth Co., Clinton, Mass.  
Darby, Edward & Sons, Philadelphia.  
Estey, W. S., 65 Fulton, N. Y.  
Gilbert & Bennett Mfg. Co., 42 Cliff.  
Howard & Morse, 45 Fulton, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
N. J. Wire Cloth Co., Trenton, N. J.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.  
W. S. Tyler Wire Works Co., Cleve'd.
- Wire Cutters.**  
Higganum Hdw. Co., Higganum, Conn.  
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**  
McFarland, Wm., Trenton, N. J.  
Newton & Shipman, 83 John St., N. Y.
- Wire Fences, See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**  
Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.  
Darby, Edward & Sons, Phila.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Ludlow-Saylor Wire Co., St. Louis.  
Ossawan Mills Co., Norwich, Conn.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Williamson, C. T., Wire Novelty Co., Newark, N. J.  
Wire Goods Co., Worcester, Mass.
- Wire Machinery.**  
Am. Tool Wks., Cleveland, O.  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Morgan Construction Co., Worcester, Mass.  
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**  
Adt, John & Son, New Haven Conn.
- Wire Nails.**  
Bond Nail Co., Raynham, Mass.  
Indiana Wire Fence Co., Crawfordsville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
Phillips, Townsend & Co., Phila., Pa.  
Salem Wire Nail Co., Salem, O.  
Taunton Wire Nail Co., Taunton, Mass.  
Whitney, A. R. & Co., New York City.
- Wire Rods, Steel.**  
New Castle Wire Nail Co., New Castle, Pa.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Whitney, A. R. & Co., 17 B'way, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel, Makers.**  
Broderick & Bascom Rope Co., St. Louis, Mo.  
California Wire Works, San Francisco.  
Hazard Mfg. Co., Wilkesbarre, Pa.  
A. Leschen & Sons Rope Co., St. Louis.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester, Mass.
- Wire Rope Machinery.**  
Kay, J. F., Passaic, N. J.
- Wood Turning.**  
Cleveland Wood Turning Co., Cleveland, O.
- Wood-Working Machinery.**  
Fay, J. A. & Co., Cincinnati, O.  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.  
Wilkinson, A. J. & Co., Boston, Mass.
- Wrenches, Manufacturers**  
Benis & Call Hardware & Tool Co., Springfield, Mass.  
Billings, Spencer & Co., Hartford, Conn.  
Coes Wrench Co., Worcester, Mass.  
Tower & Lyon, 95 Chambers St., N. Y.  
Trinmont Mfg. Co., Roxbury, Pa.  
Walworth Mfg. Co., Boston, Mass.  
Williams, J. E., Brooklyn, N. Y.
- Wringers.**  
Colby Wringer Co., Montpelier.  
National Wringer Co., Canton, O.
- Yacht Hardware.**  
Ferdinand, L. W. & Co., Boston, Mass.



# ALPHABETICAL INDEX TO ADVERTISERS.

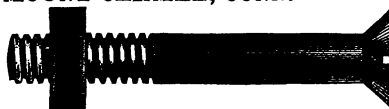
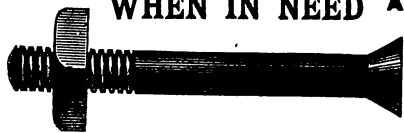
Abbott, Wheelock & Co.....	17	Brown, E. E. & Co.....	88	Crescent Steel Co.....	15	Grand Crossing Tack Co.....	10
Acme Shear Co.....	67	Brown Hoisting & Conveying Mch. Co.	34	Cresson, Geo. V. Co.....	48	Grand Rapids Cycle Co.....	75
Adt, John & Son.....	39	Brown, R. H. & Co.....	58	Croissant, M.....	81	Green, A. H.....	82
Atna-Standard Iron & Steel Co.....	19	Bryan Mfg. Co.....	94	Crosby, G. A. & Co.....	37	Griffith, Axtell & Cady Co.....	86
Alken, Henry.....	24	Bryden Horse Shoe Co.....	89	Crown Smelting Co.....	3	Gwinner Mfg. Co.....	71
Alexander Bros.....	35	Buck Bros.....	67	Cushman Chuck Co.....	42	Haight & Clark.....	26
Allentown Hdw. Wks.....	28	Buck, Chas.....	67	Dallett, Thos. H. & Co.....	44	Haines & Zimmermann.....	75
Allentown Rolling Mills.....	25	Buckeye Mfg Co.....	27	Dame, Stoddard & Kendall.....	74	Haines Gauge Co.....	24
Am. Bolt Co.....	97	Buffalo Forge Co.....	106	Dangler Stove & Mfg. Co.....	76	Halk & Naumann.....	3
Am. Metal Co.....	3	Buffalo Scale Co.....	92	Darby, Edw. & Sons.....	8	Halsey, Jas. T.....	42
Am. Pig Iron & Storage Warrant Co.	18	Burden Iron Co.....	89	Davis, I. B. & Son.....	27	Halsey, W. S. & Co.....	23
Am. Screw Co.....	12	Burgess Soldering Furnace Co.....	55	Davis, W. P.....	51	Hamilton Machine Tool Co.....	45
Am. Stamping Co.....	59	Burke, P. F.....	91	Davol, John & Sons.....	2	Hammer & Co.....	92
Am. Steel Scraper Co.....	94	Burr & Houston Co.....	22	Dayton Malleable Iron Co.....	106	Hanson & Van Winkle Co.....	30
Am. Tool Co.....	66	Bussenius & Cunliffe.....	51	Dean Bros. Steam Pump Works.....	33	Hardware Board of Trade.....	54
American Tool Works.....	51	Butler, C. N.....	6	Decatur Shaft Support Co.....	95	Harrington, E. Son & Co.....	47
Ames Sword Co.....	86	Butler Mfg. Co.....	61	Deltz, A. E.....	82	Harrington & King Perforating Co...	9
Amidon Tool Corporation.....	66	Butterfield & Co.....	42	Deming Co.....	60	Harrington & Richardson Arms Co.	72
Anderson, F. S. & Co.....	97	Butts & Ordway.....	37	Detrick & Harvey Machine Co.....	47	Harris Mfg. Co.....	75
Ansonia Brass & Copper Co.....	2	Butze, Adolph.....	54	Detroit Foundry Equipment Co.....	25	Harrison Safety Boiler Wks.....	29
Arcade File Works.....	64	Byram & Co.....	28	Diamond Clamp & Flask Co.....	106	Hart Mfg. Co.....	42
Arcade Malleable Iron Co.....	21	C. & C. Electric Co.....	30	Diamond State Iron Co.....	89	Hartford Steam Boiler Insp. and Ins.	
Arcade Mfg. Co.....	84	Caldwell Mfg. Co.....	86	Dienelt & Eisenhardt.....	38	Co.....	27
Armstrong Bros. Tool Co.....	45	California Wire Works.....	6	Diether & Barrows.....	83	Hartley & Graham.....	1
Armstrong Mfg. Co.....	43	Cambria Iron Co.....	18&21	Dietz, Schumacher & Co.....	40	Haskell, Wm. H. Co.....	98
Artificial Gas Engineering Co.....	24	Cambridge Iron & Steel Co.....	14	Dille & McGuire Mfg. Co.....	96	Hazard Mfg. Co.....	6
Atbol Machine Co.....	61	Cambridge Roofing Co.....	14	Disston, Henry & Sons.....	63	Heinisch's R. Sons Co.....	67
Atlas Tack Corporation.....	10	Canfield, H. O.....	35	Dixon, Jos., Crucible Co.....	35	Henderer, A. L.....	38
Avery Stamping Co.....	69	Canton Saw Co.....	60	Dodd, A. W. & Co.....	105	Henderson Bros.....	22
Ayer, H. C. & Gleason Co.....	39	Capewell Horse Nail Co.....	90	Dodge Mfg. Co.....	48	Hendey Machine Co.....	56
Babcock & Wilcox Co.....	32	Carbon Steel Co.....	19	Donaldson Iron Co.....	22	Hendricks Bros.....	2
Baeder, Adamson & Co.....	58	Carlin's Sons, Thomas.....	51	Douglas, W. & B.....	60	Hendrick Mfg. Co., Ltd.....	7
Banker & White.....	65	Carpenter J. M. Tap & Die Co.....	105	Draper Machine Tool Co.....	51	Hendryx, A. B. Co.....	3
Bardsley, J.....	92	Cary Mfg. Co.....	55	Dudgeon, Richard.....	40	Henley, M. C.....	71&96
Barns, C. K. & Co.....	21	Chadborne & Coldwell Mfg. Co.....	96	Dunbar Bros.....	4	Herrick, J. A.....	25
Barnes, W. F. & John.....	37	Chambers Bros. Co.....	98	Dunham Nut Co.....	97	Herrick & Cowell.....	40
Barnett, G. & H.....	65	Champion Blower & Forge Co.....	42	Dupont Mfg. Co.....	36	Hertz, T. & Son.....	3
Barnum, E. T.....	9	Champion Iron Co.....	7	Durant, W. N.....	34	Higginum Hdw. Co.....	62
Bay Foundry & Machine Works.....	29	Chandler & Taylor Co.....	26	Dwight Slate Machine Co.....	37	Hill, Clarke & Co.....	52
Bay State Stamping Co.....	49	Chapman Valve Mfg. Co.....	28	Eagle Anvil Works.....	64	Hobson, F., Seaman & Co.....	17
Bellevue Pump Co.....	61	Châtillon, John & Sons.....	78	Eagle Bicycle Mfg Co.....	105	Hoffman, J. W. & Co.....	16
Bement, Miles & Co.....	38	Cheney, S. & Son.....	21	East Chicago Foundry Co.....	22	Hogan, John L. & Co.....	16
Bemis & Call Hardware & Tool Co...	32	Chess Bros.....	22	Eccles, Richard.....	87	Hoggson & Pettis Mfg. Co.....	42
Benbow Mfg. Co.....	83	Chester Steel Casting Co.....	23	Eclipse Bicycle Co.....	57	Hollands Mfg. Co.....	61
Berger Bros.....	78	Chicago Fire Arms Co.....	72	Eddy Electric Mfg. Co.....	30	Holmes & Edwards Silver Co.....	68
Berlin Iron Bridge Co.....	11	Chicago Spring Butt Co.....	85	Enterprise Mfg. Co. of Pa.....	76	Hooker-Coilville Steam Pump Co.....	52
Bethlehem Iron Co.....	21	Chrome Steel Works.....	18	Estey, W. S.....	6	Household Sewing Machine Co.....	61
Bevin Bros. Mfg. Co.....	75	Church, Isaac.....	98	Ette & Henger Mfg. Co.....	95	Houston, C. B. & Co.....	18
Bickford Drill & Tool Co.....	45	Cincinnati Corrugating Co.....	9	Etting, Edw. J.....	16	Howard Iron Works.....	65
Bicycle Step Ladder Co.....	80	Claffen Mfg. Co.....	35	Eureka Cast Steel Co.....	106	Howard & Morse.....	7
Bigelow, C. R.....	52	Clapp, E. D. Mfg. Co.....	91	Eustis, Jas. W. Co.....	94	Howson & Howson.....	6
Biggall & Keeler Mfg. Co.....	38	Clapp, Geo. M.....	52	Evans-Friction Cone Co.....	3	Hudson, C. E. & Co.....	80
Billings & Spencer Co.....	92	Clark, G. P.....	95	Evans-Evans Mfg. Co.....	27	Hurlbut-Rogers Mch. Co.....	45
Bingham, W. Co.....	75	Clark & Cowles.....	5	F. & N. Mfg. Co.....	96	Hutchinson, F. S. Co.....	66
Birmingham Iron Foundry.....	22	Clark Mfg. Co.....	85	Fairmount Machine Co.....	47	Huyett & Smith Mfg. Co.....	39
Bissell, E. Son & Co.....	54	Clarke, Thomas.....	61	Fay, J. A. & Co.....	46	Ideal Machine Works.....	50
Blair Mfg. Co.....	95	Clauss Shear Co.....	68	Fearing, Wm. S.....	2	Ideal Mfg. Co.....	75
Blake & Johnson.....	13	Clendenin Bros.....	13	Ferdinand, L. W. & Co.....	72	Independent Electric Co.....	75
Bliss Co., E. W.....	36	Cleveland Block Co.....	87	Ferracute Machine Co.....	39	Indiana Wire Fence Co.....	7
Boardman, L. & Son.....	67	Cleveland City Forge & Iron Co...	1	Fitch, W. & E. T.....	105	Ingersoll, R. H. & Bro.....	59
Boker, Hermann & Co.....	17	Cleveland Fence Co.....	6	Fitchburg Machine Works.....	37	Iowa Farming Tool Co.....	93
Boligano Mfg. Co.....	84	Cleveland Rubber Works.....	69	Flag, Stanley G. & Co.....	106	Ives, H. B. & Co.....	85
Bommer Bros.....	106	Cleveland Stamping & Tool Co.....	82	Flint & Co.....	19	Jacobus, W. H.....	98
Bond Nail Co.....	13	Cleveland Stone Co.....	49	Folding Paper Box Co.....	54	Jarecki Mfg. Co.....	41
Boone, W. C. Mfg. Co.....	28	Cleveland Twist Drill Co.....	44	Foos Mfg. Co.....	39	Jeffrey Mfg. Co.....	34
Booth, The Lloyd Co.....	26	Cleveland Wood Turning Co.....	80	Fraim, E. T.....	85	Jenkins Bros.....	1
Borden & Lovell.....	13	Clinton Wire Cloth Co.....	8	Frankford Steel Co.....	18	Jenkins & Lingle.....	37
Borgner, Cyrus.....	26	Cobb & Drew.....	7	Franklin, H. H. Mfg. Co.....	52	Jenner, H. W. T.....	6
Boston Casting Co.....	3	Coburn Trolley Track Mfg. Co.....	84	Frost Thill Spring Co.....	91	Jersey City Galvanizing Co.....	14
Boston Gear Works.....	29	Coes, Loring & Co.....	93	Fulton Iron & Engine Works.....	46	Jessop, Wm. & Sons.....	17
Bourke Mfg. Co.....	66	Coes Wrench Co.....	93	Fulton Steam Boiler Wks. & Foundry	30	Johnson, I. H., Jr., & Co.....	46
Box, Alfred & Co.....	45	Coffin & Leighton.....	41	Gardner, Jas. & Son.....	26	Johnson, S. C.....	32
Boyce Rivet Co.....	108	Colled Wire Belting Co.....	85	Garrison, A., Foundry Co.....	19	Jones, B. M. & Co.....	19
Bradlee & Co.....	15	Coburn, A. M.....	42	Garry Iron & Steel Rfg. Co.....	13	Jones & Lamson Machine Co.....	56
Bradley Fertilizer Co.....	49	Colby Wringer Co.....	78	Gartland Foundry Co.....	19	Kanneberg Roofing Co.....	11
Brass Goods Mfg. Co.....	2	Coldwell Lawn Mower Co.....	95	Garvin Machine Co.....	52	Kay, J. F.....	4
Bridgeport Gun Implement Co.....	58	Coleman, I. A.....	53	Gautier Steel Department.....	14	Kayser, Ellison & Co.....	17
Bridgeport Mch. Tool Works.....	50	Columbian Novelty Co.....	84	Gaylord, F. L. Co.....	3	Keeley, Jerome & Co.....	16
Briggs, Marvin.....	52	Columbian Sash & Door Lock Co.....	86	Gibbs Mfg. Co.....	96	Keene Mfg. Co.....	74
Bristol Co.....	1	Conroy, P. J. & Co.....	59	Gilbert & Bennett Mfg. Co.....	8	Kennedy, Julian.....	24
Britton, Horace E.....	58	Continental Iron Works.....	29	Goddard, Asa.....	37	Keuffel & Esser Co.....	61
Britton, J. Blodgett.....	23	Corning, Edw. & Co.....	15	Goodell Co.....	69	Keys, W. W. & R. M. Co.....	8
Broderick & Bascom Rope Co.....	6	Correspondence School of Mechanics.	57	Goodell, J. W. Co.....	55	Keystone Clutch & Machine Works.....	42
Bromwell Brush & Wire Goods Co...	76	Cotton, Barclay W. & Co.....	15	Gould Mfg. Co.....	92	Kilbourne & Jacobs Mfg. Co.....	94
Bronson Supply Co.....	78	Covert Mfg. Co.....	91	Gould & Eberhardt.....	34	Kilmer Mfg. Co.....	7
Brown, A. & F.....	48	Covert's Saddlery Works.....	57	Goulds Mfg. Co.....	34	King & Andrews.....	50
		Cox, Justice Jr.....	16	Gouverneur Machine Co.....	45	King, J. M. & Co.....	65
		Cramp, Wm. & Sons S. & E. B. Co...	3	Graham, John H. & Co.....	81	Kohler, F. E. & Co.....	95
		Crawford Mfg. Co.....	75				
		Crescent Horse Shoe & Iron Co.....	91				
		Crescent Mfg. Co.....	8				
		Crescent Phosphorized Metal Co...	8				

Kreischer, B. & Sons.....	26	New Haven Copper Co.....	8	Ripley Mfg. Co.....	66	Talcott, W. O.....	84
Krogstad, W.....	65	New Haven Mfg. Co.....	38	Riverside Iron Works.....	19	Tanite Co.....	49
La Belle Steel Co.....	20	New Haven Wire Mfg. Co.....	6	Roberts, A. & P. & Co.....	18	Taunton Locomotive Mfg. Co.....	81
Lafin & Rand Powder Co.....	22	N. J. Wire Cloth Co.....	8	Roberts Mfg. Co.....	34	Taunton Wire Nail Co.....	9
Lake, J. H. & D. Co.....	49	New Process Twist Drill Co.....	44	Robertson, E. C.....	54	Thomson, W. H. & Co.....	18
Lane Brothers.....	88	Newton & Shipman.....	17	Robinson-Rea Mfg. Co.....	23	Tiebout, W. & J.....	85
Lane & Bodley Co.....	27	N. Y. Belting & Packing Co.....	35	Rochester Lamp Co.....	78	Tilghman's Pat. Sand Blast Co., Ltd.	27
Laughlin, Alex. & Co.....	24	N. Y. Powder Co.....	22	Rogers, The Wm. Mfg. Co.....	68	Titchener, E. H. & Co.....	7
Lay, Jos. & Co.....	83	N. Y. Iron Roofing & Corrugating Co.	10	Rollason Gas Engines.....	28	Tod, Wm. & Co.....	29
Lea, J. Tatnall & Co.....	20	Nicholson File Co.....	65	Rome Brass & Copper Co.....	2	Toledo Wheelbarrow Works.....	94
Lean, D. R. Co.....	25	Nicolls, Wheeler & Co.....	15	Rose Polytechnic Institute.....	55	Toomey, Frank.....	52
League Cycle Co.....	105	Niles Tool Works.....	53	Rowland, Wm. & Harvey.....	106	Torrey, J. R. & Co.....	67
Le Count, C. W.....	91	North Bros. Mfg. Co.....	18&57	Russell, Burdall & Ward.....	106	Totten & Hogg Iron and Steel Fdry.	22&29
Leechburg Foundry & Machine Co.....	22	Northampton Cutlery Co.....	68	Russia Cement Co.....	59	Tower & Lyon.....	70
Leng's, Jno. S. Son & Co.....	106	Northampton Emery Wheel Co.....	49	St. Louis Bronze & Aluminum Works	3	Townsend, W. P. & Co.....	98
Leonard, B. E.....	93	Norton Bros.....	87	Sabin Machine Co.....	5	Trenton Iron Co.....	4
Leonard, J.....	21	Norton Emery Wheel Co.....	49	Salem Wire Nail Co.....	13	Tretchewy Mfg. Co.....	24
Leschen, A. & Sons Rope Co.....	6	Norwalk Iron Works Co.....	33	Samson Cordage Works.....	1	Trimont Mfg. Co.....	92
Levis, Henry & Co.....	21	Oakes & Irwin.....	93	Samuel, Frank.....	15	Tyler Wire Works Co. W. S.....	56
Lidgerwood Mfg. Co.....	106	Obermayer, S. Co.....	21	Saunders Sons, D.....	40	Union Hardware Co.....	70
Lincoln Iron Works.....	45	Ogden & Wallace.....	21	Scattergood, H. W.....	50	Union Mfg. Co.....	43
Lindsay, Jas. G. & Co.....	16	Old Dominion Iron & Nail Works Co.	80	Scheeler & Sons.....	5	Union Metallic Cartridge Co.....	1
Link-Belt Engineering Co.....	37	Olds Wagon Works.....	82	Schneider & Trenkamp Co.....	72	Union Show Case Co.....	72
Lockhart Iron & Steel Co.....	17	Ossawan Mills Co.....	105	Schultze Mfg. Co.....	85	U. S. Projectile Co.....	40
Lovogrove & Co.....	52	Oster Mfg. Co.....	43	Scott, Geo. M.....	37	Valentine, M. D. & Bro.....	26
Lovell, Jno. P. Arms Co.....	73	Ostrand Fire Brick Co.....	26	Scoville Mfg. Co.....	2	Valley Pump Works.....	33
Loyd, John.....	62	Ostrand, W. R. & Co.....	59	Scranton & Co.....	37	Valley Steel Co.....	1
Lucas, C. O. & Co.....	26	Otto Gas Engine Werks.....	31	Scranton Forging Co.....	89	Van Dorn Iron Works Co.....	7
Ludlow-Saylor Wire Co.....	7	Packer, C. W.....	57	Scranton Supply & Machine Co.....	51	Van Wagoner & Williams Hdw. Co.	106
Lufkin Rule Co.....	60	Palmers & De Mooy Fdry. Co.....	23	Seaman, Sleeth & Black.....	22	Vulcan Iron Works.....	26
Lukens Iron & Steel Co.....	15	Palmer Hardware Mfg. Co.....	58	Sebastian Lathe Co.....	46	Waddell Wooden Ware Wks.....	77
Lundberg, Gustaf.....	18	Pancoast Henry B. & Co.....	41	Sellers, Wm. & Co.....	47	Wais & Roos Punch & Shear Co.....	39
Lunkenheimer Co.....	28	Parker, Chas. Co.....	76	Seneca Falls Mfg. Co.....	46 & 62	Walker Mfg. Co.....	26
McCabe, J. J.....	51	Passaic Rolling Mill Co.....	21	Sessions Foundry Co.....	23	Wallace Wm. H. & Co.....	21
McCaftrey File Co.....	65	Peck, A. G. & Co.....	106	Seyfert's Sons, L. F.....	51	Walworth Mfg. Co.....	105
McCallip Fence & Wire Works.....	9	Peerless Cooker Co.....	45	Shelby Steel Tube Co.....	26	Wardlow, S. & C.....	17
McClure & Amsler.....	25	Pennsylvania Bolt & Nut Co.....	97	Sherwood Mfg. Co.....	34	Warner Elevator Mfg. Co.....	45
McCoy, Jos. F. & Co.....	43	Penna. Diamond Drill & Mfg. Co.....	23	Shoenberger & Co.....	88	Washburn & Moen Mfg. Co.....	4
McFarland, Wm.....	4	Penna. Elevator Engineering Co.....	44	Shultz Belting Co.....	1	Waterbury Brass Co.....	2
McGowan, J. H. & Co.....	33&95	Pennsylvania Mch. Co.....	51	Sickels, Sweet & Lyon.....	66	Waterbury Farrel Foundry & Ma-	
Mellvain, Wm. & Sons.....	25	Perry, W. H. & Co.....	53	Sidney Steel Scraper Co.....	95	chine Co.....	33
McKay, Jas. & Co.....	15	Philadelphia Drop Forge Co.....	22	Sigourney Tool Co.....	48	Waterbury Machine Co.....	36
McKinney Mfg. Co.....	85	Philadelphia Engineering Wks.....	25	"Silver Finish".....	13	Watson & Stillman.....	40
McKinnon Dash & Hdw. Co.....	87	Phillips, Townsend & Co.....	6	Silver Mfg. Co.....	41	Wayne, Anthony Mfg. Co.....	83
McLean, John.....	29	Phoenix Horseshoe Co.....	89	Simonds Mfg. Co.....	83	Webster, Warren & Co.....	28
McNab & Harlin Mfg. Co.....	29	Phoenix Iron Co.....	15	Singer, Nimick & Co.....	20	Wells Bros. & Co.....	43
Machinists' Supply Co.....	52	Phosphor Bronze Smelting Co.....	3	Skinner Chuck Co.....	42	Wells, Heber.....	50
Mackey, James T.....	52	Pierson & Co.....	18	Smith & Egge Mfg. Co.....	43	Wetherell Bros.....	17 & 20
Mahoning Valley Iron Co.....	21	Pike Mfg. Co.....	66	Smith, H. D. & Co.....	91	Wetherhill, Robt. & Co.....	105
Main Belting Co.....	35	Pilling & Crane.....	16	Smith, J. D. Foundry Supply Co.....	23	White, A. A. & Co.....	66
Manning, Maxwell & Moore.....	44	Pittsburgh I. & S. Eng. Co.....	25	Smythe, S. R. Co., Inc.....	24	White, L. & I. J. Co.....	67
Manville Machine Co., E. J.....	50	Pittsburgh Mfg. Co.....	35	Sommer's Son, John.....	106	White Mt. Freezer Co.....	57
Mansfield, H. H.....	52	Pittsburgh Reduction Co.....	58	Southwark Foundry & Machine Co.	28	White, Van Gahn & Co.....	66
Maris & Beekley.....	47	Place, Geo.....	51	Specialty Mfg. Co.....	67	Whitlock, Wm.....	31
Madlin, J. & Son.....	33	Plumb, Fayette R.....	68	Speidel, J. G.....	47	Whitney, A. R. & Co.....	18
Matthiessen & Hegeler Zinc Co.....	2	Plume & Atwood Mfg. Co.....	2	Spencer's I. S. Sons.....	26	Whitton, D. E. Mch. Co.....	42
Maurer, H. & Son.....	20	Pollock, W. B. & Co.....	29	Springfield Gas Engine Co.....	28	Wickes Bros.....	24
Mayhew, H. H. Co.....	59	Poole, Robt. & Son Co.....	32	Standard Fdry. & Mfg. Co.....	20	Wickwire Bros.....	7
Merrill Bros.....	28	Pope Mfg. Co.....	57	Standard Horse Shoe Co.....	89	Wilcox & Howe Co.....	86
Merrill Mfg. Co.....	40	Popping, J.....	50	Standard Lighting Co.....	71	Wiley & Russell Mfg. Co.....	41&106
Meyers, Fred J. Mfg. Co.....	77	Port Chester Bolt & Nut Co.....	97	Standard Tool Co.....	44	Williams, J. H. & Co.....	92
Miles, F. S.....	13	Porter, H. K.....	87	Stanley Rule & Level Co.....	105	Wilkinson, A. J. & Co.....	69
Miller & Van Winkle.....	4	Portland Lawn Sprinkler Co.....	95	Stanley Works.....	86	Williamson, C. T. Wire Nov. Co.....	66
Millers Falls Co.....	58&106	Pottstown Iron Co.....	18	Stark Mch. & Tool Co.....	33	Wilmot & Hobbs Mfg. Co.....	1&103
Millne, A. & Co.....	18	Pottsville Iron & Steel Co.....	15	Starrett, L. S.....	61	Wilson, E. H. & Co.....	18
Milton Mfg. Co.....	97	Powell Planer Co.....	38	Steam Gauge & Lantern Co.....	78	Wilson, John.....	66
Miner & Peck Mfg. Co.....	38	Pratt & Cady Co.....	105	Stearns, E. C. & Co.....	56	Wilson, J. Fred.....	98
Missouri Metal Co.....	2	Pratt & Whitney Co.....	43	Stepcoe, J. & Co.....	53	Wilson, W. A.....	38
Mohr, J. J.....	16	Prentiss Tool & Supply Co.....	51	Sterling Aluminum Co.....	74	Winslow, Sam'l. Skate Mfg. Co.....	74
Monce, S. G.....	75	Prentiss Vise Co.....	60	Sterling Cycle Works.....	75	Wire Goods Co.....	5
Montour Iron & Steel Co.....	21	Pullman Sash Balance Co.....	97	Sterling Emery Wheel Co.....	49	Wister, Francis.....	16
Moore, Dr. Gideon E.....	56	Putnam Nail Co.....	90	Sternbergh, J. H. & Son.....	98	Wister, L. & R. & Co.....	21
Moore Mfg. & Foundry Co.....	47	Quint, A. D.....	45	Stevens, J. Arms & Tool Co.....	64	Wolf, W. & L.....	85
Moore & White Co.....	48	Rainey, W. J.....	1	Steward & Romaine Mfg. Co., Ltd.	95	Wolf, R. H. & Co. Ltd.....	5
Moorhead-McCleane Co.....	20	Randall Fence Co.....	9	Stiles & Parker Press Co.....	36	Wollensak, J. F.....	60, 62 & 87
Morgan Construction Co.....	4	Randolph & Clowes.....	1	Stirling Co.....	31	Wood Alan & Co.....	16
Morgan Spring Co.....	4	Ransom Hardware Co.....	66	Stocking, E. B.....	6	Wood, R. D. & Co.....	23
Morley Bros.....	82	Razorine Mfg. Co.....	80	Storm Mfg. Co.....	60	Wood, W. Dewees Co.....	20
Morrison, Robert.....	28	Reading Hardware Co.....	37	Stover Mfg. Co.....	36	Woodward & Rogers.....	1
Morse Twist Drill & Machine Co.....	14	Read, Wm. & Sons.....	105	Stow Flexible Shaft Co.....	44	Worcester Mch. Screw Co.....	98
Morse, Williams & Co.....	47	Reece, Edw. F.....	42	Stow Mfg. Co.....	44	Worthington, Henry R.....	33
Morton, Thos.....	92	Reeves, Paul S.....	108	Streeter, N. R. & Co.....	80	Wright & Colton Wire Cloth Co.....	8
Moseley Iron Bridge & Roof Co.....	10	Reeves Pulley Co.....	45	Stuart & Peterson Co.....	71	Wrights'ville Hardware Co.....	57
Mount Carmel Bolt Co.....	105	Remington Arms Co.....	75	Sturtevant, B. F. Co.....	38	Wurster, F. W. & Co.....	106
Murphy, P. D.....	70	Republic Press.....	32	Sturtevant Mill Co.....	49	Wyman & Gordon.....	92
Myers, F. E. & Bro.....	60	Reynolds & Co.....	10	Sun Mfg. Co.....	77	Yale & Towne Mfg. Co.....	46&59
National Horse Nail Co.....	91	R. I. Perkins Horse Shoe Co.....	89	Superior Steel Co.....	5	Zucker & Levett Chem. Co.....	30
National Pipe Bending Co.....	31	Rhodes, L. E. Co.....	50	Supple Hardware Co.....	98		
National Saw Co.....	62	Rice Mfg. Co.....	23	Sweetser, W. A.....	21		
National Wringer Co.....	83	Richardson, C. F. & Son.....	62	Swindell, W. & Bros.....	24		
Newark Machine Tool Works.....	56	Richards, I. P.....	105	Syracuse Smelting Works.....	9		
New Castle Wire Nail Co.....	13	Ridgway, Craig & Son.....	46	Taintor Mfg. Co.....	62		
New England Screw Co.....	16	Riehl Bros. Testing Machine Co.....	34	Tablet & Ticket Co.....	50		

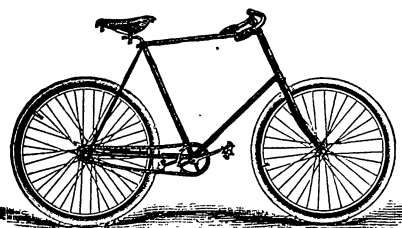
Published by DAVID WILLIAMS, 96-102  
Reade Street, New York. Printed by  
THE WILLIAMS PRINTING CO., Gen-  
eral Book, Commercial and News-  
paper Printers and Binders, 96-100  
Reade St., New York.



**WHEN IN NEED** Address **MOUNT CARMEL BOLT CO.,**  
MOUNT CARMEL, CONN.



**OUR AGENTS MAKE MONEY.**



We Make  
Wheels to Sell and  
Stay Sold.

**THE EAGLE BICYCLE MFG. CO.,**  
TORRINGTON, CONN.

**FIRST AND ONLY  
IN THE WORLD TO MAKE**

**ALUMINUM RIMS AND CLINCHER TIRES.**

**THE PRATT & CADY CO.,**

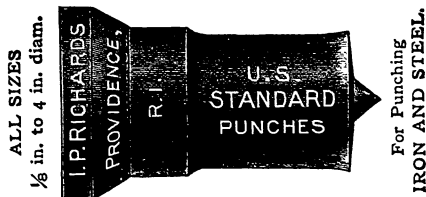
—MANUFACTURERS OF—

**IRON, BRASS COMPOSITION AND BRONZE CASTINGS**

Special facilities enable us to execute orders promptly. Prices reasonable for high grade work.

**WILLIAM A. HARRIS, SELLING AGENT, - HARTFORD, CONN.**

**The "DODD'S" LIQUID CLUE.**  
It gives Perfect Satisfaction.  
**Best.** A. W. DODD & CO., Gloucester, Mass.



**Mechanics.**—The Technical Student's Introduction to. Being a series of Practical Papers showing the leading Principles of Physical Science, exemplified in the Properties of Bodies or Materials; the laws which Regulate the Phenomena of Motion, of Heat, of the Atmosphere, of Water at Rest and in Motion, etc., etc., as applied to the Practical Work of the Architect and Builder, the Engineer and Machinist, and the General Artisan engaged in the Designing and Construction of Machines, Tools, and Appliances Useful in the Industrial Arts. By Various Writers. Edited by Robert Scott Burn. About 150 Illustrations, \$2.00.

For sale by David Williams. 96-102 Reade St., N. Y.

**WEST'S MOULDERS' TEXT BOOK**

BEING PART II. OF AMERICAN FOUNDRY PRACTICE,

Giving the best methods and rules for obtaining good castings, with detailed description for making moulds. A thoroughly practical book that should be in the hands of every moulder.

PRICE, - Cloth, - 460 Pages, - - \$2.50.

SENT, POST-PAID, ON RECEIPT OF PRICE BY

**DAVID WILLIAMS, Publisher and Bookseller,**

96-102 Reade Street.

- New York City.

**WALWORTH MFG. CO., Boston, Mass.**

**STEAM, WATER AND GAS GOODS IN ENDLESS VARIETY**

—SEND FOR CATALOGUE—

**PLUMBERS' AND FITTERS' TOOLS AND SUPPLIES.**

Tools for cutting and threading Wrought Iron Pipe, Die Plates and Dies, Stillson Pipe Wrench, Miller's Ratchet Die Plate, Brass and Iron Valves and Cocks, Wrought Iron Pipe and general Machinists' Supplies.

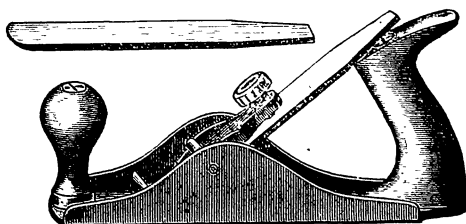
IMPROVED  
Labor-Saving  
**CARPENTERS'  
TOOLS.**

**STANLEY**  
RULE & LEVEL CO.  
New Britain, Conn.

SOLD BY ALL

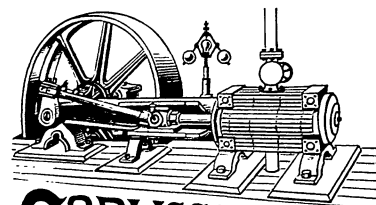
Hardware Dealers.

**STANLEY'S IMPROVED SCRUB PLANE.**



This Tool has a single Iron, with the cutting edge rounded; and is particularly adapted for roughing down work before using a Jack or other Plane.

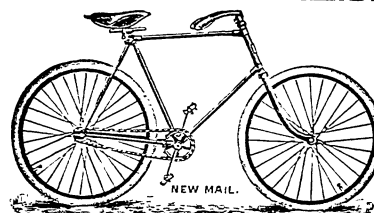
No. 40. Iron Stock, 9½ in. length, 1½ in. Cutter, \$1.00



**CORLISS ENGINES**  
**MACHINISTS**  
IRON FOUNDERS, BOILER MAKERS.  
**ROBT. WETHERILL & CO.**  
CHESTER, PA.

**Special**  
**Special**

TRADE PRICES FOR JUNE ON  
**NEW MAILS.**



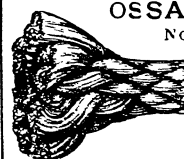
Finest High Grade of '94. In great demand everywhere. Write us NOW for quotations.

MANUFACTURERS,

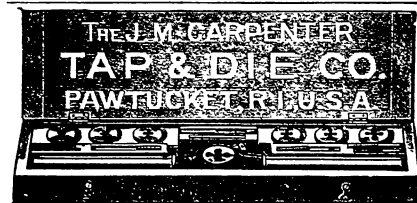
**WM. READ & SONS,**

107 WASHINGTON ST., BOSTON, MASS.

**OSSAWAN MILLS CO.,**  
Norwich, Conn., U. S. A.

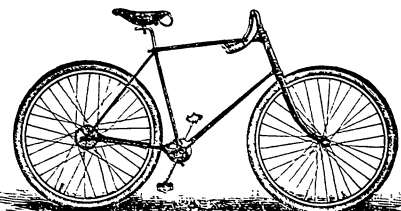


HEADQUARTERS FOR  
Bright Wire Goods, Picture  
Wire, Nails, Knobs and Hooks,  
Brass Chain, Spool Wire, etc.  
Crown and Giant Braided  
Sash Cord, Masons' and Clothes  
Lines.



**A SATISFIED CUSTOMER**

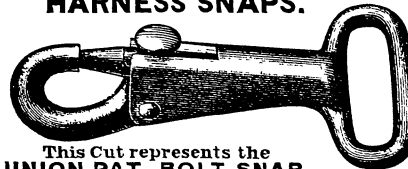
is the best advertisement. This is the way they talk when asked how they like



**THE LEAGUE CHAINLESS**

after a 40-mile ride over hills and muddy roads: "If I was buying 50 bicycles 49 of them would be the League Chainless, and the 50th a chain machine for a relic!" This simply voices the opinions of thousands of others who have ridden the League Chainless. THE LEAGUE CYCLE CO., Hartford, Ct.

**THE W. & E. T. FITCH CO.,**  
NEW HAVEN, CONN.  
Manufacturers of a variety of  
**HARNESS SNAPS.**



This Cut represents the  
**UNION PAT. BOLT SNAP.**

**PAUL S. REEVES,**  
Philadelphia.

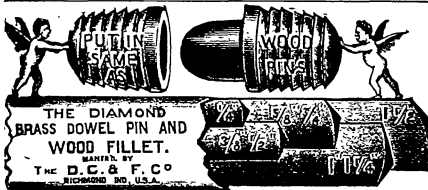
**Phosphor Bronze**

AND

**BABBITT METALS.**

**Lead Lined Car Bearings a Specialty.**

**Brass and Phosphor Bronze Castings from ¼ pound to 20,000 pounds in weight.**



**STANLEY G. FLAGG & CO.,** Philadelphia, Pa.  
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.  
Manufacturers of **STEEL CASTINGS**,  
A Substitute for Steel and Wrought Forgings.  
Circulars Sent on Application.

**ROLLER JACK SCREW.**

**See Page 58.**

**MILLERS FALLS CO.,**  
93 Reade St., New York.

**EUREKA CAST STEEL COMPANY.**  
Office and Works, Chester, Pa.  
Open Hearth, Crucible and Eureka Steel Castings.  
Railroad and Machine Castings.  
Locomotive Cross-Heads and Gearing a Specialty.  
Guaranteed Knuckles for M. C. B. Couplers.

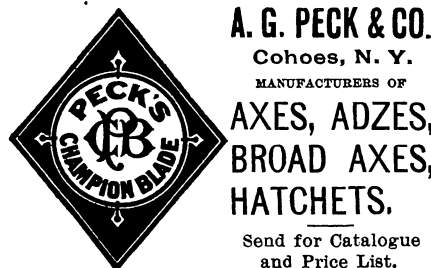
**SPRINGS AND AXLES**  
ROLLING MILL.  
**F. W. WURSTER & CO.**  
375 Kent Ave. Brooklyn N.Y.



**LIDGERWOOD**  
**HOISTING ENGINES.**  
370 styles and sizes. Over 10,000 in use.  
**LIDGERWOOD MFG. CO.,** 96 Liberty St., N. Y.

ESTABLISHED  
Spring Making, 1842. Steel Making, 1845.  
Norway Iron, 1871 (Re-Rolled).

**WM. & HARVEY ROWLAND,**  
MANUFACTURERS OF  
Springs, Steel, Re-Rolled Norway  
Iron & Slit Norway Nail Rods.  
Address FRANKFORD P. O., PHILADELPHIA.

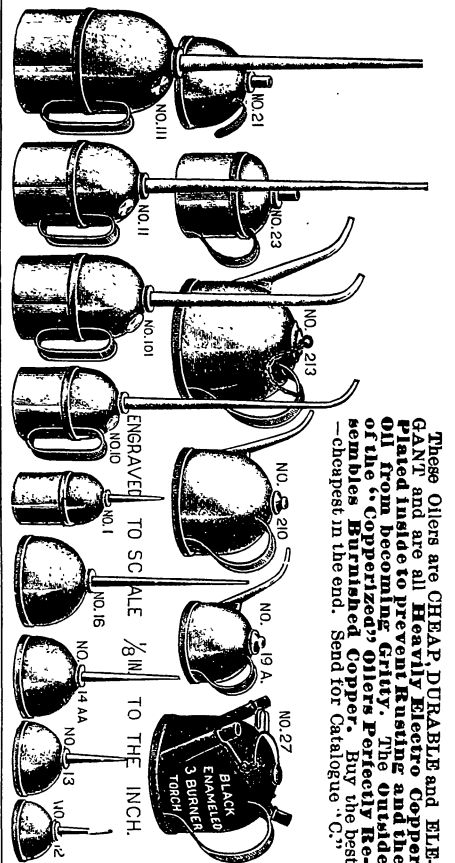


**THIS IS THE TIME TO BUY**  
**Lemon Squeezers**  
WRITE FOR PRICES TO  
**JOHN SOMMER'S SON,**  
355-365 Central Ave., Newark, N. J.

**RUSSELL, BURDSALL & WARD,**  
Portchester, N. Y.,  
Manufacturers of  
Carriage, Tire, Plow and Stove  
**BOLTS**

Carriage Bolts made from Best Square Iron a Specialty.

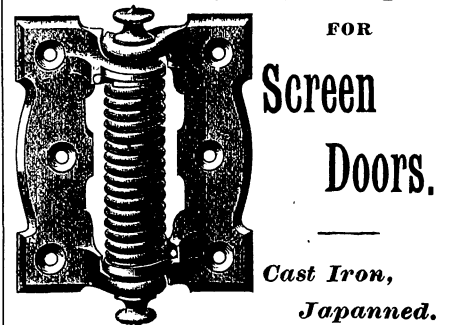
**THE WILMOT & HOBBS MFG. CO.'S**  
NICKEL PLATED, also  
"COPPERIZED" SEAMLESS STEEL ANTI RUST OILERS  
C. R. SWEDGH  
LAMPS, FILLERS, TALLOW POTS,  
TORCHES,  
ENGINEERS' AND STEAMBOAT SETS, Etc.



**SEE FRONT COVER.**

*Special Notice to the Trade.*

**Columbia Spring Hinges**



These Hinges are very simple in construction. They are packed flat, with the tension of the Springs adjusted, and are "ready for business" as soon as attached to the door.  
Having no small or loose parts, they cannot get out of order.  
They are reversible and can be used on either Right or Left Hand Doors.  
No. 14, 3 x 2½, Japanned.  
1 Dozen pairs in a box. ½ Gross pairs in a case.  
**THE CHEAPEST AND BEST SPRINGS IN THE MARKET. SEND FOR PRICES.**  
MANUFACTURED BY  
**VAN WAGONER & WILLIAMS HDW. CO.,**  
Cleveland, Ohio, and 14 Warren Street, New York

# THE IRON AGE

THURSDAY JUNE 21, 1894.

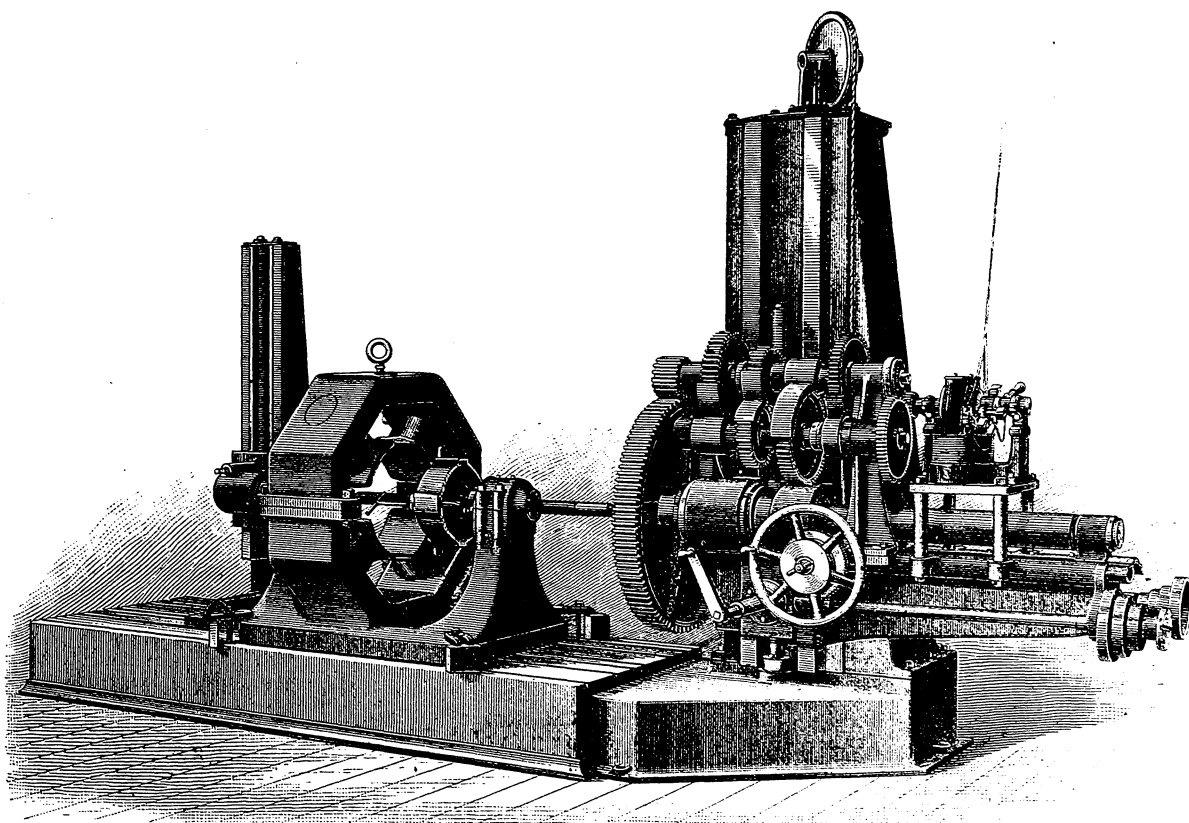
## Electrically Driven Boring Mill.

Beaman & Smith of Providence, R. I., have designed and built an electrically driven boring mill which consists of a bed piece, or platen, on which is attached an upright column carrying the spindle head, which is vertically adjustable from 22 inches to 5 feet above the platen. This spindle head carries all gearing necessary to drive the tool in cutting, and also suitable mechanism for several feeds, all of which derive power from the motor conveniently placed directly on the traveling head. The feed of the spindle is 31 inches

cutting tool is also taken against a ball bearing back of the spindle, reducing the friction to a minimum. The machine weighs about 10 tons and stands about 10 feet high and 18 feet long. The general dimensions are: Spindle, 5 inches diameter, with No. 6 Morse taper hole; driving gear, 36 inches diameter, 4 inches face, 3 pitch; spindle quill, front bearing 8 inches diameter 9 inches long, rear bearing 7 inches diameter  $6\frac{1}{4}$  inches long; platen, 40 inches wide 15 inches high; upright, 20 inches wide; feed,  $1\frac{1}{2}$ , 40, 80, 120; revolutions of spindle per minute, (1.9) (2.8) (3.8) (5.75) (8.5) (11.5) (13.33) (20) (26.66) (40) (60) (80).

resolutions had to be translated into French, German, Italian, Belgian and Polish.

**The Johnson Cast Projectile.**—The "Proceedings" of the United States Naval Institute, Volume 20, No. 1, published at Annapolis, Md., contain an admirable paper by Ensign R. D. Tisdale, U. S. N., entitled "The Johnson Cast Steel Armor Piercing Shot." Profusely illustrated, it traces the development of the cast A. P. projectiles made by Isaac G. Johnson & Co. of Spuyten Duyvil, N. Y. The progress thus far made is highly encouraging. In trials against a 10-inch nickel steel



ELECTRICALLY DRIVEN BORING MILL.

by hand or power. The range of speeds makes it possible to bore a 48-inch hole, as well as to drill a 1 inch hole, with all intermediate sizes. The motor runs 800, 1200 and 1600 revolutions per minute. The ratio of gearing from the motor to the spindle is 20, 60, 136 and 408. Opposite the spindle is an outer column for supporting boring bars. This column carries a small sliding head which, by suitably graduated strips, can be made to coincide quickly and accurately at all times with the spindle. This column has a longitudinal adjustment on the platen and can be placed from 3 to 10 feet from the main upright column. This movement by racks and pinions can be accomplished quickly. The spindle head is counterbalanced by a weight in the column, and in connection with the ball bearing step, the head can be moved up and down the column with a slight amount of power. The thrust of the

The machine is provided with a motor manufactured by the Crocker-Wheeler Electric Company of 39 Cortlandt street, New York. The engraving is from a photograph taken at the works of the latter company, and represents the machine boring a large field.

With the view of warding off distress among the agricultural population in seasons of crop failure, Russian statesmen are preparing a scheme for the insurance of crops by the State. The insurance is to be compulsory so far as farming lands are concerned, the rates varying according to the conditions of the various districts.

At a recent meeting of striking coal miners in Illinois, it was desired to adopt a set of resolutions. In order that all present could vote intelligently, the

plate in January of this year all of the shots, with the exception of one, showed a performance equal to that of good forged steel A. P. projectiles. In speaking of a later test against a 10 $\frac{1}{4}$ -inch Harveyized nickel steel plate, Mr. Tisdale says: "To all intents and purposes, judging from the second round, the Johnson cast steel shot did as much work on the plate as the forged steel projectile did."

The New York and New Jersey bridge, authorized by Congress and approved by the President, will cost nearly \$40,000,000, according to present estimates. The company are bound by the terms of the bill to complete the structure in ten years. Moreover, they are required to expend at least \$250,000 the first year and \$1,000,000 annually until the work is completed. They expect to arrive at this consummation in half the time required by the law.

## Garrett on Capital and Labor.

William Garrett of Joliet, Ill., who is well known in the iron trade as the inventor of the rod mill which bears his name, has in his breezy way discussed capital and labor in a recent address, from which we quote the following :

Society is divided into two classes—producers and consumers. For while all producers are consumers all consumers are not producers. Take the dude, for instance. He is like the lily of the field, he grows, but he toils not, neither does he spin ; yet Solomon in all his glory was not arrayed like one of them. In my opinion he should be like the grass of the field, which "to-day is, and to-morrow is cast into the oven."

There is another class of non-producers—the twin brother of the dude—the tramp. The most effective way to make producers of them would be to chain them together, then each would have such a disgust for the other that they would, on condition of being released, offer to work.

In order to protect the consumer laws have been made making monopolies, trusts and combinations unlawful, and no manufacturer has any right to do anything to protect himself against ruinous competition. They must stand the brunt, and between the rights of the consumer and the rights of the laborer the capitalist has a very bad time of it to-day.

The rights of capital—and it has rights that must be respected—are not only entirely ignored, but every political demagogue and labor agitator uses every means he can to intensify the feelings of the workingmen against capital.

Who ever heard of the press occupying column after column in sympathizing with capital ? Are there any sympathetic comments made of the many failures that take place every day ? The majority of the men who fail in business are men who have lived as you have so often advised workingmen to live. They did not patronize saloons, but by a great deal of self denial, thrift and economy saved their hard earned earnings, and after they had accumulated a certain sum embarked in business, thereby becoming capitalists. What sleepless nights, what anxious days they had no one knows. Then all at once the savings of years take wings and fly away. What then ? Are there relief societies formed to aid them ? Does the press sympathize with them ? Is there a contribution taken up to help them ? Why not ? They are well deserving people. No ! With a statement that they had suspended they are forgotten. And you can take up *Dun's* or *Bradstreet's* any time and you will see that failures take place daily. You hear of the successful in business mostly only when they are abused by some political demagogue—ward heeler, labor agitator or walking delegate.

There was no time in the history of this country when it was so unpleasant to be a capitalist. With all due respect to the rights of labor and sympathy for the laborer—in which I will not take the back ground with any labor agitator or philanthropist—I will state this most emphatically, that labor to-day is more tyrannical to capital than capital is to labor. Every day last week we read of violence being committed by some of the strikers. Bridges burned, cars destroyed, mine property blown up with dynamite, private property invaded, lives lost, law and order outraged. And no matter what the provocation, this

cannot be justified by any loyal American citizen.

That capital has a right to combine to protect itself against ruinous competition in process is not only denied, but condemned in severest terms, for anything that tended to interfere with free competition trampled on the rights of the consumer. That labor has the right to combine to defend itself against ruinous competition in wages is approved in the most pronounced language from the President down to the tramp. In fact labor combination is looked upon as the only safe ground the laborer has to prevent low wages. Now, as a matter of fact, does not the increase in wages increase the cost of a manufactured article as much as the same increase in profit to the manufacturer ? If so, why condemn the one and approve the other ? If free competition is right in the one case why not in the other ?

It can be proved beyond a doubt that the only way combination or trust can exist in this country is by their selling their product so cheap that no small capitalist can profitably embark in the business. Illuminating oil, sugar and matches, the products of the three greatest combines in the world, are sold by retail cheaper in this country than in any other country in the world. This is the result of the combination of capital.

It is claimed by some (which I dispute) that the only thing that keeps up the rate of wages in this country is organization, or a combination of labor. Let us admit that to be so ; then as we are in this country paying more than double what is paid anywhere else, which adds to the cost of production, which of course increases the cost to the consumer. Come now, let us be candid and honest (this is no political convention) ; does not organized labor trample on the rights of the consumer by interfering in free competition in labor ? A man had two sons ; he said to one, "Go." He said, "I go," but went not ; to the other he said, "Go." He said, "I will not," but went. Who obeyed the father ? the one that said he would go and went not, or the one who said he would not go but went ? The one that went, of course. So in all disputed points it is only results that decide the question. Therefore any man who believes that the rights of the consumer demand free trade, free commerce between all nations as free as the Gospel dispensation, must also believe in free emigration ; and if he denounces monopoly, trusts or combination on the part of capital for trampling on the rights of the consumer, then to be consistent he also must denounce combination of labor. But how few have the courage to openly express their conviction ?

To my mind too much importance has been attached to the rights of the consumer. Let us see what we get to give as claimed by them, their just rights. Never in the history of the last 30 years have they reveled in cheap products as they do to-day. Fifty-cent wheat, five-cent cotton in sight. Wearing apparel 35 to 45 per cent. cheaper than two years ago, and a pawn shop in Joliet ! Believing in protection from foreign competition, to be consistent, I believe also the combination of capital and the combination of labor in self defense to be right. And we shall never have peace and prosperity in this country until there is a better understanding between capital and labor. Capital is like copper, labor like tin, arbitration like phosphorus ; combine the three in

unity and we have bronze, one of the strongest of all alloys. The trouble is to-day we have the wrong combination. Instead of a combination of labor against capital it should be a combination of labor with capital. Talk about the evils of combination ; why the nation is a combination of people, nature is a combination of forces, the universe a combination of atoms.

My first objection to organized labor is the violence, outrage to law and order that follow in the wake of almost every strike. That they have the right to strike for whatever wages they please to ask no one disputes, but that they should interfere with any others who want to work for anything they please is denounced by all law abiding citizens. Suppose a combination of capital which has a monopoly in a certain business should invade the property of another who attempted to manufacture the same article, and blow up the premises with dynamite : it would cause as much stir as the firing on Fort Sumter did, yet in principle, whether done by a combination of capital or a combination of labor, both acts are the same.

Another objection is the entire indifference which skilled organized labor has toward the common laborer—not only indifference, but in some cases brutality toward them. Suppose there was a strike among the skilled labor in any establishment, and the poor laboring man, who depends on to-day's earnings for to-morrow's food, should go to work : they meet him on his way home and give him a dose of club moral suasion to prevent him from working next day. Men working for 90 cents to \$1 a day are too poor to organize, and they get no benefits while the strike lasts.

Taking the future welfare of this nation into consideration, the common laboring man cuts the greatest figure. Owing to universal suffrage every man, be he rich or poor, is entitled to a vote. Numerically they outnumber the rich and it is numbers that tell at the polls. Intelligence, law and order and progress go together ; ignorance, mob rule and depravity go hand in hand. And how an American citizen can raise, feed, clothe and educate his family to become good, intelligent citizens on 90 cents a day is past my finding out. And strange to relate, the only people who have any feeling or practical sympathy for the poor laboring man are the blood-thirsty corporations who have no souls, such as the Standard Oil Company, sugar trust and match trust ; and even Carnegie, who pay their common labor from \$.120 to \$.130 per day—yet we philanthropists denounce trusts and monopoly.

The day is coming when this will be the most serious problem this Government will have to face : to protect the weak laboring man from the selfishness and avarice of those who employ him. Steps will be taken in legislation that will state in most emphatic language, "Thus far shalt thou go and no further," and that point I hope will be when his wages will be such as to enable him to live comfortably and raise his family to become intelligent citizens, or else we will go the way of all nations, and our name become a blot on history.

By a recent decision of a United States Court the upsetting die patents for upsetting eye bars, patented by J. F. Kingsley of Athens, Pa., were adjudged valid.

### The Barr Air Lock.

The air lock used in pneumatic caisson work consists of a chamber provided with two doors, both opening toward the interior. To enter the lock the outer door is opened, the inner door serving to confine the air in the caisson. Upon closing the outer door, the air is

in the lock has been reduced to that of the atmosphere the outer door can be opened. It is evident that by this process a quantity of air under a pressure equal to that in the caisson is absolutely lost every time the lock is opened. The amount of air lost at each passage equals the cubical contents of the lock less the material in it at the

lost in closing these doors. A lock intended to overcome these difficulties has been designed by W. C. Barr of the Cockburn Barrow & Machine Company of Jersey City, by whom it is built. The accompanying drawings show the lock in plan and vertical section. The lock is provided at each end with a pair of sliding horizontal doors similar to the sliding doors separating two rooms of a house. These work on cast iron guides and are actuated by pneumatic pistons supplied with air from the caisson. The two pairs of doors and their frames are alike; the lower one is attached, air tight, to the top of the iron shaft leading to the caisson, and is separated from the other door by a section of shaft of the length desired for the lock. Each frame of each door has a hole of the full size of the shaft. The surface of the doors C D are planed so as to make a tight metal joint with the machined surfaces of the bearings of the frame. The doors slide toward or from each other to close or open the lock, and they require no packing except the rubber gasket strip separating the meeting edges of the doors. In the upper part of Fig. 2 the doors are shown closed and in the lower part are shown opened, the lock as thus arranged being open to the caisson. Each half of each door is connected with the piston of an air cylinder, piped as indicated in the drawings. The cylinder A operates the door C, the cylinder D the door B, and so on. Valves are conveniently arranged for admitting and releasing air from the cylinders. A very slight pressure is sufficient to slide the doors, as the only resistance to be overcome is inertia and friction. The bucket shown in the center of the lock is operated from the outside, the hoisting rope passing through a special stuffing box. Several of these locks are now in operation on the caissons for the foundation of the building being erected by the American Surety Company at Pine street and Broadway, New York.

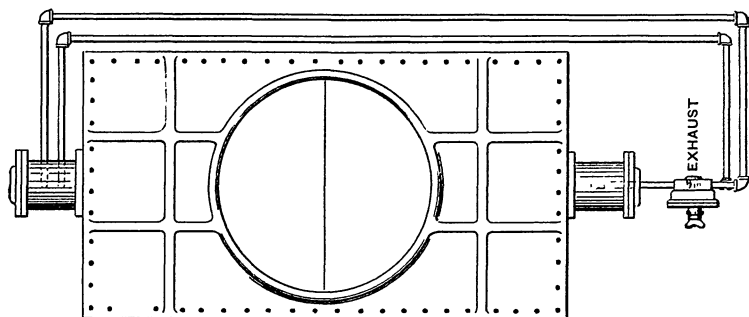


Fig. 1.—Plan.

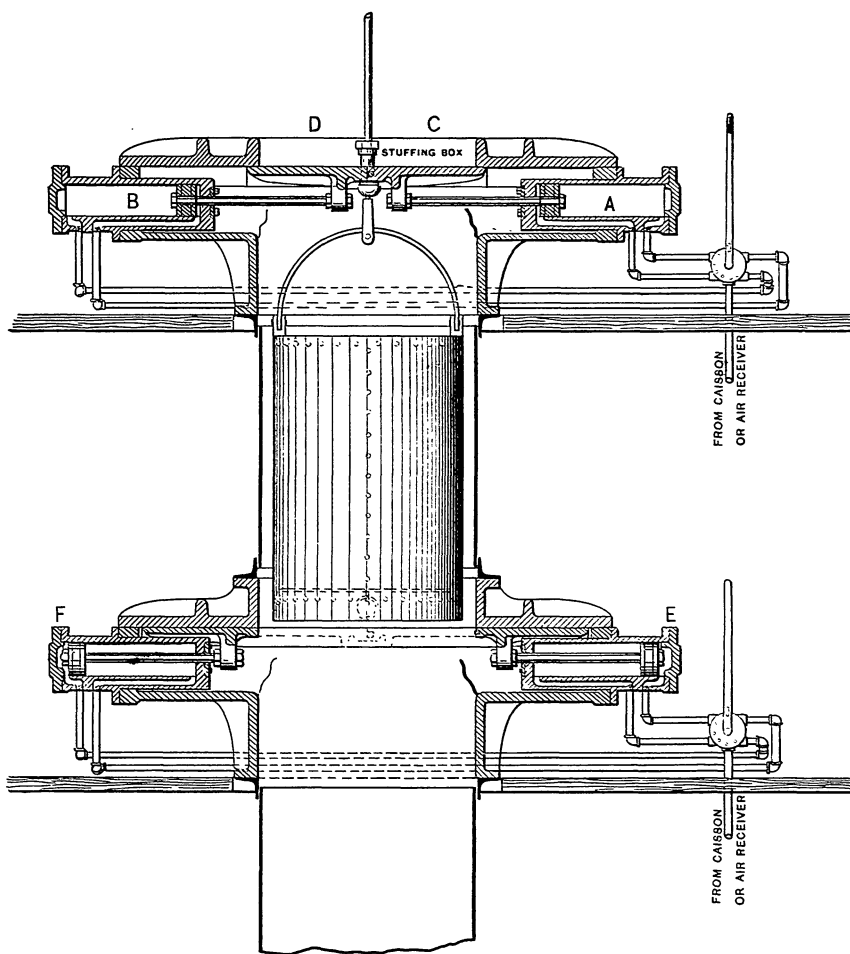


Fig. 2.—Vertical Section.

### THE BARR AIR LOCK.

admitted through a suitable valved pipe from the caisson to the lock. When the pressure in the lock equals that in the caisson the inner door can be opened to permit entrance into the caisson. To pass out of the caisson the inner door is closed and air from the caisson admitted into the lock. When equilibrium of the pressures in the lock and caisson has been obtained the valve in the pipe leading to the caisson is closed and a valve opened to permit the air in the lock to escape. When the air pressure

time of opening. Compressing air to the extent required in some pneumatic foundation work is an expensive operation and any method is desirable by means of which a portion of the air lost can be saved.

The doors of air locks, as usually constructed, swing upon hinges toward the interior. In filling the lock with material, a space sufficient for the outer door to swing in must be left unoccupied. The air filling this space is therefore lost at each opening. Time is also

The next meeting of the Verein deutscher Eisenhuettenleute will be held at Duesseldorf on July 15. Herr Ehrhardt will present a paper on the "Manufacture of Spiral Weld Pipe;" Herr Klatte of Neuwied will speak on a "New Process for Rolling Weldless Chains," and Franz Brunnck will treat of a "New Coke Oven System and Its Development."

The Richmond & Danville Railroad was sold last week under foreclosure to representatives of Drexel, Morgan & Co., for \$2,030,000. The sale is said to be preliminary to the reorganization of the Richmond Terminal system, under the name of the Southern Railroad Company, which will shortly be in operation.

The Bureau of American Republics is informed that the Peninsular Railway of Yucatan is to be pushed forward rapidly to completion, the work to be finished within two years.

The Spanish Government have proposed the appointment of a mixed commission to settle the difficulty between Spain and the United States in regard to the Cuban tariff.

The National Association of Millers, in convention in Chicago, adopted a resolution favoring Senator Washburn's bill for reciprocity in agricultural products with South America.



## The Mechanical Engineers

The evening session on Thursday was opened with a paper by M. P. Wood on "Rustless Coatings for Iron and Steel." It is a general summary of the methods in vogue without special reference to any experience personally acquired. Mr. Wood summarizes his conclusions on the whole question of how best to protect iron and steel from corrosion as follows:

after an exposure of over 500 years with no other protection than that afforded by the closed room in which they were placed.

Don't think your own product would not under the same conditions last as long as the piece of iron that was walled into one of the burial chambers of the Pyramid 8000 years ago.

Don't put it in any location where it cannot be inspected and its true condition ascertained at any time, by anybody, your successor in the trust not excepted.

tice of to day, until in some cases we seem to need protection from the engineer quite as much as from the decay of the materials in which he experiments.

Don't imagine that Macaulay's New Zealander, who has sketched the ruins of England's power and greatness, and has come to the New World to see how we have fared from the gnawing teeth of time, will not recognize amidst the ruins of our Statue of Liberty, Brooklyn Bridge and other monuments of our progress, the ominous streaks and stains due to the corrosion not only of

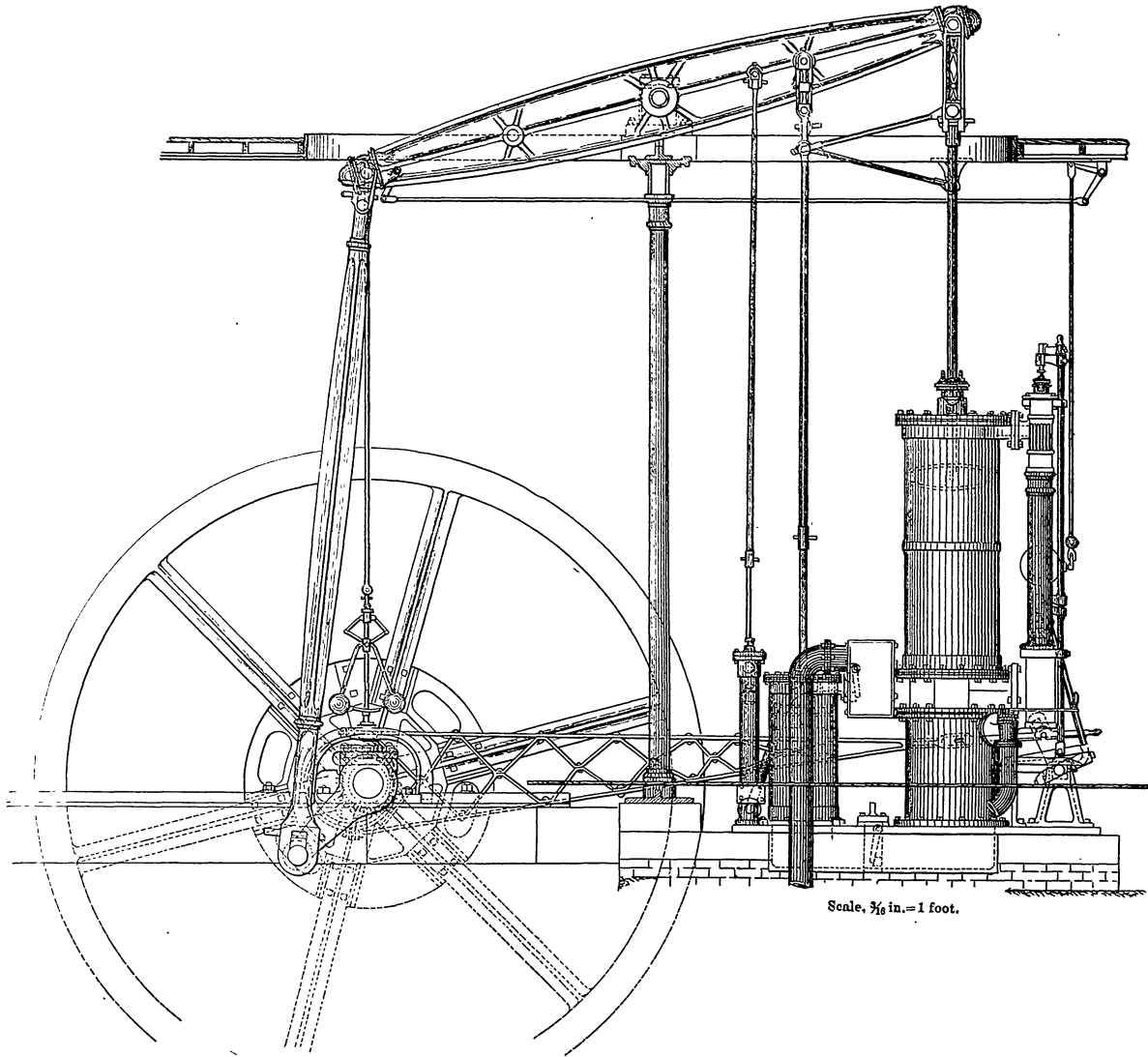


Fig. 4—First Stationary Steam Engines in America.

WATT ENGINE BUILT IN 1815.

Don't use anything but common iron.  
Don't have any scale on that.  
Don't use anything but the best iron and steel.

Don't polish those.

Don't paint it with anything but pure linseed oil and oxide of lead or graphite paints.

Don't let the air get to it if it is damp.

Don't keep it from the air if the air is pure and dry.

Don't let sea air, sea water, acidulated or sulphurous, ammoniacal or other fumes and liquids have access to it.

Don't think it unnecessary to protect it in any case, because swords, armor and other bright articles of iron and steel have been found uninjured by rust

Don't think that magnetic oxide, electroplating, enameling or any other method of protection will take the place of constant inspection, even if the coating is fired on by a Columbiad.

Don't imagine because Cleopatra's Needle has had to have a coating of wax to protect it, that it is not a good material to apply to other substances than granite.

Don't let the cost and interest accounts be the governing factors in the case of protecting any metal superstructure on whose continuity and strength human life and safety depend. The old story of "for want of a nail the shoe was cast, the horse disabled, a battle and kingdom lost," finds too many parallels in the engineering prac-

iron and steel, but that of the better class of metals, and will exclaim: "We are wiser in our generation and fear not and can control these forces that, like the Arch, slumber not nor sleep."

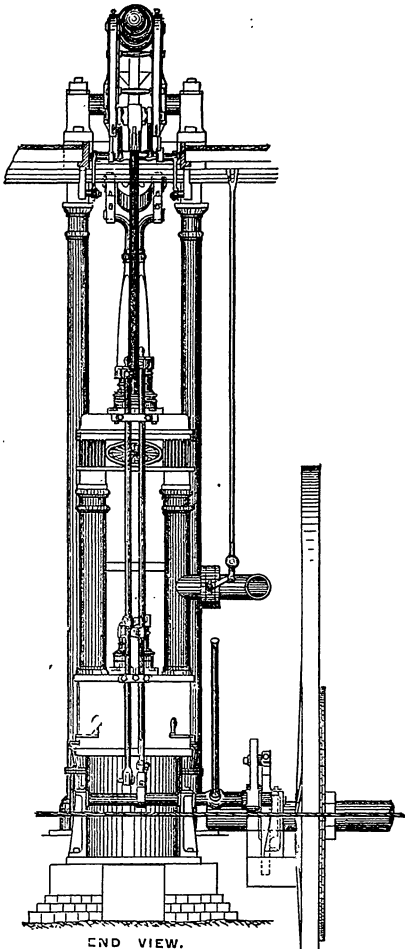
In the discussion, J. F. Holloway called attention to the fact that tin roofs in Montreal were not painted, a circumstance which was attributed to the use of good materials and the distance from the sea air. C. W. Nason reported that for tank and outdoor use, in his experience, the best protection is the P. & B. paint, a solution of asphalt in bisulphide of carbon. Gus. C. Henning called attention to the experiments recorded by W. Thomson in a paper read before the English Society of Chemical Industry. The method proposed is to



connect structures by wire with a ball of zinc buried in moist ground, thus transferring the destructive effects of electrolytic action to an outside body.

James McBride of Brooklyn related his experience with a number of boilers in his paper, "The Corrosion of Steam Drums." From his observations and experiments, extending over nearly four years, he draws the following conclusions:

1. That the corrosion is due primarily to excessive moisture in the steam in the drum.



2. That moisture in this case was due to the priming of the boilers and surface condensation in the drum.

3. That the trouble was aggravated, because no provision was made to take away the water from the drums by drip pipes.

Professor Hutton presented a sketch of a 3-inch cast iron elbow from the bottom of the descending column of a Bulkley condenser used near Port Henry, N. Y., as an illustration of mechanical corrosion. J. T. Hawkins gave it as his experience that currents of water in pipes wear away the metal, and that the impact of steam or water or water laden steam produces the same result. L. S. Randolph noted that water charged with sediment causes corrosion by attrition and by the mechanical removal of the oxide. Fred. Grimm reported that trouble caused by corrosion in steam coils was overcome by establishing good drainage.

C. W. Hunt of New York was then called upon for his paper on a "New Mechanical Fluid," which may be called the most interesting contribution to the proceedings. It aroused a good deal of attention, and, after the Friday session, placed Mr. Hunt under a steady fire of eager questions. A model showing the action of the balls was shown, together with full sized connecting rods equipped.

#### "First Stationary Steam Engines in America"

was the title of a paper by Professor Hutton, the secretary of the society, and was an answer to the following question which he had received recently: "What, when and where was the first steam engine in America (not locomotive and not steamboat engine)?"

It occurred to the writer to make individual inquiry among those conversant with such matters, with most interesting results, which it is the purpose of the remainder of this paper to record, in the hope that the contributors may be induced in the discussion of it to give even fuller detail, and that by this publication other engineers may be induced to take part in filling up the record and rendering it complete.

W. F. Durfee writes: "In the last year of the eighteenth century there were but three steam engines in the United States. One of these was used—probably built as well—by Oliver Evans in Philadelphia for grinding plaster; another was an imported engine, built by Hornblower and brought to America by his son and put at work for driving the Schuyler copper mine in New Jersey. The third engine is said to have had a *locus* in New England, but just where I have never been able to discover."

Samuel Webber writes: "I find in looking up my old memoranda that the second steam engine in Providence, R. I., of 24 horse-power, was built by Oliver Evans for the Providence Bleaching, Dyeing & Calendering Company in 1814. The next date I have is a steam cotton mill, at Olneyville, Providence, in 1831, but whether this was the old Providence steam mill, which was one of the first, if not quite the first one, I am not now sure. Your correspondent must look to some Rhode Island authority to settle this point. I have also a note of a steam mill in Fall River in 1831, but cannot say what one, possibly the Metacomet; their first mills were all water power. North of Boston the first one was the Bartlett steam mill of Newburyport in 1838, followed by James in 1843, then came the Ocean of the same place in 1846, and the Portsmouth of same date."

Chas. W. Copeland, in reply to an inquiry, writes a letter full of most interesting details, from which the following quotations are taken:

"My father built the first engine for power purposes in I think about 1826 or 1828. My father [Daniel Copeland] had the largest machine shop in Connecticut, and the only one in the State which built steam engines and boilers; there was a shop in Boston kept by a man, I think named Aschraft, who built small engines; I remember that he had an application to build a 20 horse-power engine, and he declined because it was too large for him, but he would build for him two engines of 10 horse-power each to work together. When my father took his first engine to build it was for a blowing engine for a foundry in Hartford, and my father went to New York to get men to go to Hartford to work on it, as there were no men in Hartford

who had any experience in that class of work. I worked on the engine when building, also when being erected; I do not know what afterward became of it.

"About the time of which I am writing, a Mr. James (the same who put the first locomotive on the Harlem Railroad) built a small engine for a coffee and spice factory; it had two cylinders, in fact a compound engine, only the cylinders had both the same bore and one cylinder exhausted into the other; Mr. James claimed that this tended to economy of fuel—I differed from him and I remember we had quite an argument."

The paper mentions other old engines which Professor Hutton discovered in the course of his correspondence. The drawings, Fig. 4, show a 90 horse-power beam engine, built in 1815 by James Watt, Lancashire, England; cylinder, 31 inches diameter; stroke of piston, 72 inches; 18 revolutions per minute with 8 pounds steam pressure; common jet condenser and 24-inch air pump; feed pump worked from beam, to supply boilers. The crank shaft and connecting rod are made of cast iron.

The engine was brought to Savannah and erected at the rice mills of McAlpin & McInnis. It has been working regularly since and was put in good repair by John Rourke & Son, Novelty Iron Works, Savannah, Ga., August, 1891.

To the discussion W. F. Durfee contributed the following: "I am in receipt of your very interesting paper on 'The First Stationary Steam Engines in America.' Possibly the mill in Fall River, which Mr. Webber states was driven in 1831 by steam, was the American Print works. I am sure these had a steam engine before 1840. Mr. Webber must be wrong in his surmise as to the Metacomet Mill, for that was not built until some years after 1840."

"In the paper by the late Fred. Graff, entitled 'The History of the Steam Engine in America,' published in the 'Journal,' of the Franklin Institute for October, 1876, from which I quoted largely in the discussion of Allan Sterling's paper on water-tube boilers (see 'Transactions' American Society of Mechanical Engineers, &c., vol. vi., pp. 588, 589), there is an account of the engine erected at Centre Square, Philadelphia (where the new public buildings are now), for supplying the city with water. This engine was put in operation in 1801, and was abandoned in 1815. The cylinder of this engine was bored in Pater-son (I think), N. J., and several weeks were required for the work. I have a strong suspicion that the restoration by John Rourke & Son of the Boulton & Watt engine at Savannah was something more than restoration. Farey, 'On the Steam Engine' (1827), does not give any representation of any such valve gear or arrangements of side pipes and steam chests or condenser as is shown in the plate. The eccentric rod is also suspiciously modern. The beam, connecting rod, parallel motion, cylinder, air and feed pumps are very likely Watt's, but the valve gear, steam chests, side pipes, eccentric rod, and condenser (that is, its position under the cylinder) are too exact a reproduction of those used on the Sound and the Hudson to have been made by Watt in 1815. Stuart, in his 'Anecdotes of the Steam Engine' (1829), does not show any such perfection in valve gear. In an article communicated to the *Scientific American*, March 17, 1894, I give some account of Avery's rotary engine, of which a considerable number were made and sold by Lyndes & Son, Syracuse, N. Y.,

in 1832-35. The engine described was used to drive the presses of the *Railroad Journal*, and its editor, Mr. Minor, speaks in high terms of its compactness, the ease with which it is managed by any person who can tend a fire, the trifling cost of fuel, as well as the small outlay for the engine; and goes on to say that its most important advantage will be found in its perfectly uniform motion. This engine ran at a velocity of 5000 revolutions per minute. I have reason to believe that the early engine whose *locus* I could not fix when I wrote you, was actually used in New York City for driving a sawmill. Perhaps some of the old shipbuilders could tell you something about it. The Baldwin Locomotive Works commenced building stationary engines quite early. I think there is one still in operation in New Bedford which was built by them in 1836."

Henry Binsse read a contribution to the subject, from which we quote as follows: "On reading your short paper on the 'First Steam Engine,' I applied to Charles Bradley of Newark, the great-grandson of Josiah Hornblower, for more detailed information. With great courtesy he gave me two pamphlets on the subject, one entitled 'Josiah Hornblower and the First Steam Engine in America,' by William Nelson, secretary of the New Jersey Historical Society; the other a pamphlet written by a member of the Hornblower family, describing the various steam engine improvements made by them. The engine was ordered in 1748 or 1749, and Benjamin Franklin refers to it in a letter of February, 1750, saying that the cost of the engine was £1000 sterling. This was evidently the price of the machinery in England, for later on a gentleman who visited the engine at work records that it had cost, set up, about £3000 sterling. It is to be hoped that this note will not cast a feeling of gloom over the engine builders present at the meeting. It is quite clear that they were all born about 150 years too late and that the earliest were also the golden years of the steam engine. A little over four years later the engine was shipped from London, arriving, after a three months' voyage, in September of 1753. It might be suspected from this delay that the intention was to make Colonel Schuyler believe that he was about to receive very full value for his money; but, although there may be something in this, it is more likely that it was found very difficult to secure permission to ship the machine, as England, with all a mother's tender solicitude, expressly forbade any of her colonies from playing with machinery of any kind whatever. No machinery was allowed to be exported. The exception in this case was probably due to Colonel Schuyler's high position. A year and a half was spent in erecting the machine, pump, power house and whatever was required to start the engine. The duty of the engine was about 8 hogsheads of water per minute. Josiah Hornblower, the first steam or mechanical engineer in America, became a very prominent man, going to the New Jersey Legislature, afterward to Congress, and filling many highly respected positions. There was another steam engine erected in New York City in 1774 for a water works, by Christopher Collis, which you can add to your engine list."

O. C. Woolson writes: "In the discussion of the first stationary steam engine in America, the early history of municipal water works occupies a prominent part. The New York Times, in an

issue in September, 1874, printed the following, which is quoted without assuming any authority of the exactness of its statements:

"The first water works in the United States appear to have been planned and constructed by J. C. Christensen, at Bethlehem, Pa., more than a century ago, namely, in 1762. The machinery consisted of three single acting force pumps, 4 inch caliber and 18 inch stroke, worked by a triple crank, and geared to the shaft of an undershot water wheel 18 feet in diameter and 2 feet clear in the buckets. The total head of water was 2 feet. On the water wheel shaft was a wallower of 33 rounds, gearing into a spur wheel of 52 cogs, attached to the crank. The three piston rods were attached each to a frame or cross head working in grooves, to give them a parallel motion with the pump. The cross head was of wood, as well as the parts containing the grooves as guides. The water was raised by this machinery to the height of 70 feet, and subsequently to 114. The first rising main was made of gum wood, as far as it was subject to great pressure, and the rest was of pitch pine. In 1786 leaden pipes were substituted; in 1813 they were changed for iron. These works were in operation as late as 1832."

De Courcy May of Niagara Falls presented a record showing

#### Cost of an Indicated Horse-Power.

The estimate made by the writer is as follows:

From such data as I have been able to collect I give in the table below the cost of 1 indicated horse-power for 365 days of 24 hours each and 308 days of 10½ hours each, the 10½ hours representing the running time in the ordinary mill or factory:

	Per cent.
The interest on the plant is placed at...	5
The depreciation on the plant is placed at.....	5
The insurance on three-quarters of the plant is placed at.....	1
The taxes on three-quarters of the plant are placed at.....	1½

No rental or interest on the land occupied by the plant or cost of water is charged.

The value of the land occupied varies so largely, especially with electric lighting and trolley plants in large cities, as to make the insertion of these figures misleading.

engines are nearly all high class and of large powers; the figures in the table are, therefore, rather below than above the average.

Samuel Webber, in a written communication, urges that the size of the engine is a very important item. He offered some data in substantiation of that fact which he obtained from the treasurer of the Globe Yarn Mills, Fall River. The records cover the months of April, May and June, 1893. At No. 2 Mill there is a 1050 horse-power cross compound condensing Wetherill engine. With coal costing \$3.70 per ton, the outlays for a period of 73 days of 10 hours were as follows:

#### Cost of Running a 1050 Horse-power Wetherill Engine.

Coal, 1,527,000 pounds.....	\$2,519.55
Labor.....	555.50
Oil.....	51.50
Supplies.....	25.00
Total.....	\$3,151.55
Equal per horse power.....	12.65
Sinking fund, 5 per cent. on cost..	3.14
Interest on taxes, 6 per cent. on cost	3.77
Repairs, 2½ per cent. on cost.....	1.57
	\$21.13

Add 10 per cent. for available power.....	2.11
---	------

Total cost for available power per annum..... \$23.24

For a smaller engine, of only 650 horse-power, at No. 3 Mill, which cost \$42,000, the cost during 76 days was as follows:

#### Cost of Running a 650 Horse-power Engine.

Coal, 1,152,380 pounds.....	\$1,901.43
Labor.....	463.60
Oil.....	42.50
Supplies.....	21.50
Total.....	\$2,429.03

Equal per horse-power.....	15.19
Add sinking fund, 5 per cent. on cost.....	3.23
Add interest and taxes, 6 per cent. on cost.....	3.88
Add repairs, 2½ per cent. on cost.....	1.62
	\$23.92

Add 10 per cent. for available power.....	2.39
---	------

Total..... \$26.31

Mr. Webber expresses the belief that these are close to minimum figures.

The paper was also discussed by A. C. Cady and A. E. Hart.

After the session Professor Bovey

	Cost of one I.H.P., 365 days of 24 hours.				Cost of one I.H.P., 308 days of 10½ hours.			
	Coal per 2,240 lbs.				Coal per 2,240 lbs.			
	\$2	\$3	\$4	\$5	\$2	\$3	\$4	\$5
Triple expansion pumping, Allis, 20 revolutions..	48	55	61	67	31	33	35	37
Triple expansion without pumps, Allis, 50 revolutions.....	27	33	39	45	16	18	20	22
Compound mill, best engine.....	29	36	44	51	17	19	21	24
Compound mill, average.....	39	46	52	58	22	25	28	30
Compound electric light, average.....	122	139	157	174	78	84	90	96
Compound trolley.....	48	58	68	79	29	32	36	39
Triple expansion trolley.....	45	54	64	74	26	29	33	36
Condensing mill.....	44	52	61	69	25	29	33	38
Non-condensing, 50 to 200 horse-power.....	70	76	81	88	49	53	57	62

The figures for engines below 50 horse-power vary so widely that they are omitted. The above table has been calculated as far as possible from actual engines running under ordinary conditions, but I do not pretend that the figures represent true average values, not having been able to collect information from a sufficient number of cases. The

gave an exhibition of the powers of the large testing machine of the university, breaking a large steel beam.

On Friday morning the first paper read was one by G. W. Bissell on the "Effect of Varying the Weight of the Regenerator in a Hot Air Engine." This was followed by a contribution by W. R. Roney entitled

**"Mechanical Draft."**

In considering this question Mr. Roney said that the importance of good draft, natural or artificial, has long been recognized by engineers. There are two well-known means used for accomplishing this result, viz.: natural draft, produced by a column of heated gases in a chimney of suitable proportions; and forced draft, obtained by mechanically creating a pressure under the grates with a blower or fan. A third means, less widely known, is mechanical exhaust or induced draft, produced by a suction fan so arranged as to draw the waste gases from the furnace and discharge them into a short stack sufficiently high to clear the surrounding buildings.

The largest and most successful applications of mechanically induced draft have been made in connection with feed

independently of the amount of heat in the stack, it is possible to obtain a higher temperature of feed water in the economizer, and a lower temperature of escaping gases than could possibly be obtained with a chimney, and at the same time provide sufficient draft to maintain rapid and economical combustion of the fuel. There are undoubtedly many boiler plants equipped with economizers and chimneys, where the draft is so greatly reduced by the economizer that it is an open question whether the saving in fuel by thus heating the feed water is not more than balanced by the loss due to imperfect combustion in the furnace; and whether it would not result in a greater saving in coal to cut out the economizer and get better combustion, and a higher initial temperature due to better draft. Unquestionably the "black eye" which fuel economizers have sometimes received

ical exhaust draft, is probably caused by the well-known large amount of power required to drive the high speed pressure blowers and fans used for forced draft. Mechanical draft handles a large amount of heated gases with slow speed exhaust fans at a low pressure, and with a small expenditure of power. To illustrate: the writer recently designed a mechanical draft and economizer plant for 6000 horse-power of water tube boilers, providing duplicate large slow running fans of special design, each driven by an independent engine, and each having a capacity, estimated in tons of coal burned per hour, sufficient to develop 25 per cent. in excess of rating, or 7500 horse-power. The power required to drive one fan to do this work was six-tenths of 1 per cent. of the boiler horse-power developed. Or, estimated in coal per horse-power per hour, and at \$8 per ton, the fuel cost of operating the plant one year was 2 per cent. of the estimated cost of the chimney originally planned for the plant. In other words, it would not pay to build the chimney so long as money was worth more than 2 per cent. per annum.

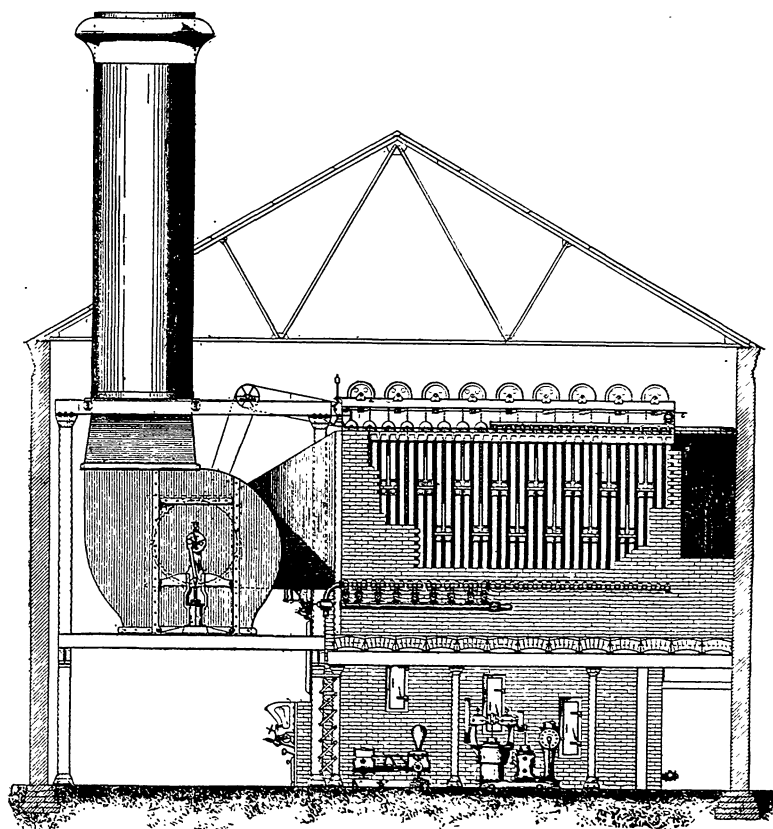
A section, Fig. 1, is presented of a typical boiler house, showing boilers, stokers, economizer, mechanical draft, feed pump and condenser. In this illustration the economizer is elevated upon columns and beams to provide for utilizing the space under the economizer for feed pumps, condenser, &c. The exhaust fans, of which there are two placed side by side, are equipped with direct connected engines, only one engine showing in the illustration, the other being on the farther side. These fans and engines are of special design, with protected bearings, self oiling and water jacketed, to withstand the heat when the economizer is cut out for cleaning or for repairs, and the hot gases pass directly to the fans. They are so proportioned to their work as to handle a maximum amount of gases with a minimum expenditure of power.

The arrangement of the economizer pipes and blow off connections are worth noticing, in that they provide a means of blowing out the sediment which may accumulate in the pipes, and at the same time a complete circulation is maintained in the economizer. Many extensive plants are now in operation, or in process of construction in various parts of the country, equipped with economizers and mechanical draft similarly arranged.

The following data will be of interest, as showing in tabulated form the results obtained by economizers and mechanical draft in a number of plants in regular service. In nearly every case the feed water was partially heated by exhaust steam heaters, or in hot wells by condensed steam from various sources:

*Tests of Economizer and Mechanical Draft Plants, Showing Initial and Final Temperatures of Blue Gases and Feed Water in Degrees Fahrenheit.*

Plants tested.	Gases entering economizer.	Gases leaving economizer.	Water entering economizer.	Water leaving economizer.	Gain in temp. of water.	Fuel saving, per cent.
1	610	340	110	287	177	16.7
2	505	212	84	276	192	17.1
3	550	205	185	305	120	11.7
4	522	320	155	300	145	13.8
5	505	320	190	300	110	10.7
6	465	250	180	295	115	11.2
7	490	280	165	280	115	11.0
8	495	190	155	320	165	15.5
9	595	200	180	311	181	16.8



*Fig. 1.—Cross Section of Typical Boiler House.*

water heaters designed to utilize the waste heat of the flue gases and known as fuel economizers. This form of feed water heaters has been manufactured in England for over 50 years and in this country for three or four years. But they have been imported for many years, as their value as a fuel saving device is well established. Their successful operation is, however, so dependent upon good draft that no well informed engineer would think of installing an economizer without making provision for much better draft than the boilers would require without it.

Mechanical draft possesses great advantages over natural draft in its flexibility and adaptability to both large and small capacities, and in its ability to meet sudden and excessive demands for steam, either by an extra turn of the throttle valve, or by an automatic regulator controlling the steam supply to the fan engine according to the boiler pressure. It is unaffected by atmospheric changes, furnishing the desired amount of draft irrespective of conditions of wind or weather. Operating

has been often due to bad engineering, and to placing them where the chimney draft was none too good already, the result being that they not only failed to show the economy that the purchaser expected, but so impeded the draft that the efficiency and capacity of the boilers were greatly impaired. It was quite natural, under such circumstances, that the economizer should be neglected and allowed to foul up by the accumulation of sediment within the pipes, and of soot without, until it became a source of loss instead of economy.

A mechanical draft plant properly designed, with duplicate fans and engines of suitable construction, so arranged that one is always in relay, can be made so reliable that the boilers cannot be shut down by any ordinary accident. With the fans properly designed and proportioned to the work, the power required to operate them is so small as to practically have no effect on the economy obtained. The mistaken idea that prevails somewhat, even among intelligent engineers, regarding the amount of power required for mechan-

An abstract was read of a paper by Professor R. C. Carpenter on the "Saturation Curve as a Reference Line for Indicator Diagrams."

The members present then passed unanimously a series of resolutions acknowledging the courtesies extended to them, the one referring to Professor Bovey receiving particularly hearty applause.

Professor D. S. Jacobus presented a paper prepared jointly by Professor James E. Denton, R. H. Rice and himself, entitled: "Results of Measurements of the Water Consumption of an Unjacketed 1600 Horse-Power Compound Harris Corliss Engine." The engine was in use at the cotton mill of the Bristol Mfg. Company at New Bedford. It is of the cross compound type, and of the following dimensions: Diameter high pressure cylinder, 30.025 inches; diameter low pressure cylinder, 55.915 inches; stroke of both cylinders, 72 inches. Average clearance each end high pressure cylinder, per cent. piston displacement, 2.6 per cent. Average clearance each end low pressure cylinder, per cent. piston displacement, 3.6 per cent. Each cylinder has separate eccentrics for the admission and exhaust valves, respectively. The cylinders are unjacketed on both the head and barrels.

The receiver between the cylinders is a cylinder 29 inches diameter and 13 feet long, having an annular space about its barrel which was intended to be used as a live steam jacket. This jacket is not generally used. In the experiments here described no live steam was admitted to it, and it was connected with the interior of the receiver; all drip pipes for draining the jacket, and the interior of the receiver, being tightly closed.

The results show a water consumption of 13.50 pounds of steam per hour per indicated horse-power with 125 pounds boiler pressure, 0.30 cut off in high cylinder, steam 14.6 degrees of superheated at the throttle valve, and 65.2 revolutions of the engine per minute. The plant as a whole affords the remarkable economy of 1½ pounds of coal per indicated horse-power per hour, with an unjacketed compound engine expanding steam about 13 times.

A particularly interesting feature of the paper were the records of the careful calibration of the indicator springs.

In a communication to the secretary Frank H. Ball said:

"Referring to the record before us, it appears that a horse-power is developed on 13½ pounds of steam per hour, which is close to the best recorded performance of triple expansion engines in which more than 20 expansions are generally obtained. Therefore the efficiency of the engine cannot be due to the number of expansions. Neither can it be due to the small clearance, as the engine does not excel in this respect. The absence of steam jackets will hardly be claimed to account for the economy. It is true that high piston speed is obtained, but this is due to the unusual length of the cylinder, and therefore would warrant the expectation of greater cylinder condensation rather than less. It does not appear that the steam distribution was remarkably perfect. The probable reason for the high efficiency obtained from this engine is that the high pressure cylinder developed power more economically than where expansion is carried too far in this cylinder."

The final paper of the meeting dealt with a few notes on the

#### "Corrosion of a Cast Steel Propeller Blade,"

presented by Frank B. King of Sparrow's Point, Md., who referred to the steamer "Alabama." The vessel is a fast passenger steamer plying the waters of the Chesapeake Bay. The propeller in question was 12 feet 9 inches diameter and 19 feet pitch, and had four cast steel blades mounted on a cast iron boss. The normal revolutions are about 98 to 100, making the speed of tips about 4000 feet per minute. The corrosion was peculiar in its rapidity and its distribution. Instead of being confined, as usual, to the back of the blade, well out toward the tip and leading edge, it covered about two-thirds of the back of the blade; in fact only a small area toward the center and along the following edge escaped. The working face was in good condition. Such was the rapidity of this corrosion that, after running four months, it was found advisable to renew the blades in cast iron.

An analysis of the drillings taken from the four blades and one spare blade exhibited the following characteristics:

	Car- bon.	Sili- con.	Phos- phor- us.	Man- gan- ese.	Sul- phur.
1.....	0.35	0.30	0.038	0.58	0.046
2.....	0.31	0.22	0.034	0.51	0.042
3.....	0.35	0.25	0.032	0.55	0.046
4.....	0.35	0.34	0.030	0.57	0.040
5.....	0.46	0.30	0.030	0.65	0.034

Gus C. Henning suggested that the cause of the corrosion in many cases lies in the air which follows into the apparent vacuum created behind the blade in its movement.

After the session the members again visited the testing laboratory, where Professor Bovey showed his testing machine, whose readings are affected by the extension of the test piece under stress created by the heat of the hand held in proximity to it. We believe that the majority of the visiting engineers were deeply impressed with the wonderful equipment of the mechanical and physical laboratories which McGill University owes to the liberality of John Macdonald, one of Montreal's leading citizens. Among other appliances the University possesses the most complete set of Reuleaux models in existence in America. We believe that Canadians will learn more and more to appreciate the great value of this, the latest department of the McGill University. It is certainly, so far as facilities go, abreast of most advanced developments, and needs only active use and continued support to prove of inestimable value as a factor in the industrial development of the Dominion. We know that to some of the leading engineers present the study of the facilities afforded by Mr. Macdonald's munificence proved so strong an attraction that they were able to give but little attention to the business of the meetings.

Friday afternoon was set aside for a garden party at the residence of Mrs. Molson, Piedmont Hall. Not content with having lavished hospitality upon their guests, the citizens of Montreal put a fitting climax upon their endeavors by organizing an all day excursion to Ottawa.

According to European advices a labor exhibition, to which foreign exhibits will be admitted, is now under way at Luxemburg. It will be open until September next. The principal

object of this exhibition is to make known the different types of improved small motors, machine tools, tools, as well as the accessory apparatus used in the different trades in the minor industries, as well as products made with these instruments; also the finished products, intermediary products, and the raw products or the raw materials necessary for the different manufactures.

#### The Trouble at Duquesne.

In regard to recent troubles at the plant of the Duquesne Tube Works Company, at Duquesne, Pa., we have received the following official advices:

After a shut down of about two weeks we started up our mill on some business we had secured meantime, on the evening of June 5. There was no question of wages raised by our men when they resumed work. On the next afternoon the mob of strikers from McKeesport came down to our mill, and compelled our men to quit work and leave the works immediately.

After they had thus been compelled to leave the mill the question of an increase of wages was raised by some of the men, and a committee was appointed to see us and request an advance. We told them that the business we had on hand and the general conditions would not warrant an increase of wages at this time. After a discussion of the matter the committee expressed themselves as satisfied with the position of the company and left us with the impression that they would advise a return to work at the present rate of wages. Another meeting of the men was afterward held, and a majority of them were apparently opposed to coming back to work without an advance in wages, but we have reason to believe, however, that the great majority of our men are ready to resume work, as far as wages are concerned, but are afraid that the McKeesport strikers would again interfere and perhaps do them injury.

Since the action of the mob in driving our men from work we have been unable to get a man to come to work and we have consequently been obliged to let the fires go out of our furnaces, considerably to our damage, as we will probably have to rebuild them before they will be fit for work again.

Our mill is now completely shut down and no work being done at all, except a little shipping by our office force. We are confident that we could start our mill without trouble so far as our own men are concerned but for the fear they have that violence might be done them by the McKeesport strikers.

It is not likely that we will start our works until the trouble at McKeesport has been settled.

The Cleveland, Lorain & Wheeling Railroad have secured estimates for 56 new steel bridges, and the total amount is \$62,000. Three years ago the same bridge work was under consideration, and it is stated that the lowest estimate at that time for the same structures was \$122,000. This is a striking proof of the decline in prices.

It is reported that a new steel of wonderful temper has been produced by a Japanese navy arsenal official, Yamana, Hanojyo. Several experiments are said to have been made with the new steel at the navy arsenal, the Yokohama shipyards, the Tanaka factory and other Government establishments in Japan, with results that are described as excellent in all respects.



## Tools for Turning Pins and Rivets.

The makers of new tools for turning pins and rivets, P. I. Conroy & Co. of Paschall, P. O., Philadelphia, state that with them a boy can make on an ordinary hollow spindle lathe from 75 to 100  $\frac{1}{8}$  x 1 inch pins an hour out of  $\frac{1}{8}$ -inch brass rods. The first tool, shown in Fig. 1, reduces the rod to size, it being fed by the tail stock of the lathe. This tool leaves a shoulder under the head of the pin, which is removed by the tool, Fig. 2. The pin is then cut off the proper length by the opposite side of the tool, Fig. 3, which is shown in the last engraving.

## San Francisco News.

Pig iron still continues to come to this city by rail, carload after carload, in all a couple of hundred tons within a very brief period. At the same time very little has arrived by sea. Taken as a whole there has been quite a good deal of iron of all descriptions imported here

for and received estimates from them. The contractors offered to do the work for \$10,000 less if allowed to use beams made from Eastern steel blooms. The commissioners laid over the matter for a few days to hear expert testimony as to whether steel blooms were raw material. But during one of the sessions of the commission there was quite a fracas owing to supposed insinuations made against a member of the commission. It was stated that if the Atlas Iron Works, an institution in which the commissioner was interested, had been given a certain small sub-contract the question at issue might have been decided more favorably to the contractors. The assailed commissioner thereupon declared that he bought the shares that he owned in the iron works in question at a delinquent sale for the small sum of \$100 and that he would sell them all to the contractor at his own price and give him unlimited time in which to settle the matter. This shows clearly enough the estimation in which shares in a foundry in San Francisco are held and tell very

There have been no special changes in price in any line since I last advised you. Nails are firm but have gone no higher. There has been quite a considerable importation by rail for the past two weeks, but the supply has been light by sea and the holders of stocks are very firm.

During the week the "Francis Kerr" has come to hand with 10,000 boxes tin plate, making the total by sea to date 71,567 boxes. The market is quiet at \$5.40 per box for coke.

The American Association for the Advancement of Science will hold its annual session in Brooklyn from August 15 to August 24. E. H. Bartley is chairman and W. H. Hale is secretary of the local committee of membership.

The formal transfer of the Navy Yard land, purchased by the city of Brooklyn for \$1,284,000, was made on June 11. With the money thus obtained some important improvements will, it is said, be made at the Brooklyn Navy Yard. Among the projected work is a new sea

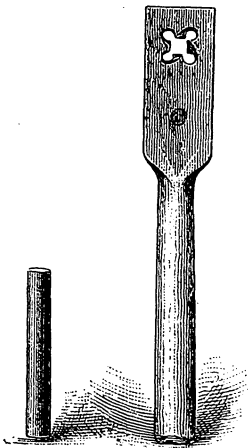


Fig. 1.

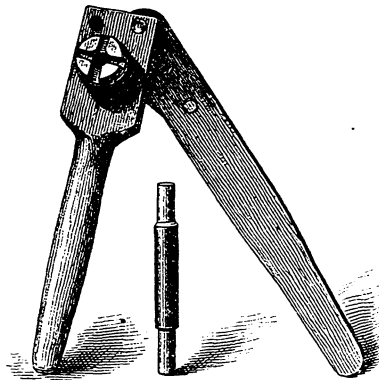


Fig. 2.

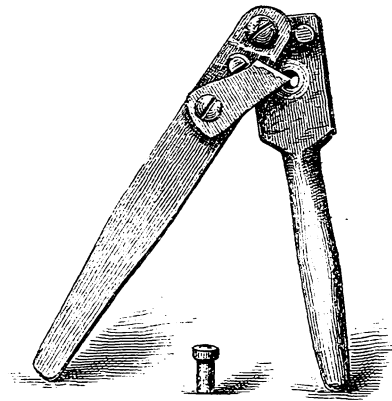


Fig. 3.

## TOOLS FOR TURNING PINS, RIVETS, ETC.

by rail of late. It will probably cease to be a notable feature of the situation ere long. Pig iron remains very dull and quiet at \$18 for American and \$20 for foreign. Matters are very quiet among the foundries, and incidents are cropping up from time to time which show it in an unpleasant light. One of our local sensations during the past week has been the struggle between the contractors for the city hall dome and the City Hall Commissioners as to the exact interpretation to be placed upon the term "raw materials" in the contract. The commissioners contend that it means such as cannot be produced in California; the contractors say that steel blooms are raw material. They say that as the Pacific Rolling Mills are the only establishment in the State that can produce steel blooms, to compel them to patronize that establishment would be establishing a monopoly. They aver that steel blooms constitute raw material, in the true sense of the words. They had gone ahead and ordered the Judson Iron Works to roll beams for the dome out of Eastern steel blooms, and now there is a chance of their being obliged to cancel their contract with the Judson Iron Works and pay what price the Pacific Rolling Mills may think proper to ask. The rolling mills, however, say that all the bidders—the present contractors included—asked

eloquently the history, much of it, of the foundry industry in this city for a couple of years past. The fact that the shares of what used to be one of the notable foundries of this city should be esteemed by a gentleman well known in commercial and general society and political circles as worth practically nothing should give us pause. It is true that some of our foundries have developed their various interests very greatly of late years and that where practical bankruptcy was pending, prosperity, —measurable, that is to say—now exists, but it no less is true that save in these exceptional cases a sad change has come over the spirit of the dream of our foundrymen. The business has narrowed in dimensions, while the market is much more restricted than it used to be. It was hoped that the present Congress would have given our foundrymen raw materials free, but this it has failed to do. The reduction proposed, should the bill ever pass, will be of some benefit, as it reduces the duty on pig and scrap iron and ingot steel. This will give us some advantages in our contest with Eastern foundry and machine men as far as the trade of the coast is concerned. Even a few dollars a ton is an object, and should such a reduction be obtained it will impart an access of activity to the work in our foundry and machine shops.

wall, the clearing out of the Wallabout channel, and the erection of several new buildings. The naval hospital is to be enlarged by the addition of a new wing, and improvements are to be carried out in it which will make it one of the finest hospitals in the country.

The Mexican Cotton-Coffee Colonization Society have purchased 2,500,000 acres of land in the State of Coahuila, on the Mexican Central Railroad, which they will colonize with both white and colored people. Another corporation, the Mexican Land & Improvement Company, having headquarters at Kansas City, Mo., have bought a large tract of coffee land in the vicinity of Taucuhitl, lying near the line of the Mexican Railroad. They will commence colonizing at once.

It is reported that extensive dock property has been purchased at Everett, a suburb of Boston, in the interest of a Nova Scotia coal company, supposed to be "backed" by William C. Whitney and other prominent New York capitalists. The property, it is said, consists of 800 acres, with more than a mile of water front, and the Boston & Maine and Canadian Pacific Railroads are mentioned as the principal avenues of distribution.

### Proper Connection of Steam Boilers and Engines.\*

The full title of this topical question was "Are there certain general principles underlying the power connection of steam boilers and engines in a power plant?" For the purpose of having some fixed basis to work from the writer has taken for an ideal plant the following specifications of boilers and engines, and the necessary items to make a complete and modern steam plant:

#### Boilers.

Four 66 inch by 16 foot horizontal tubular boilers, rated at 100 horse power each, and to be set in one battery with full arch fronts, and all necessary fittings, such as safety valve, steam gauge and siphon, water gauge with

cross head pin, wrenches, crank shield, cylinder cock, drip connection for steam chest, foundation bolts, and one 4½-inch steam separator for each engine; feed water heater to be 42 inches diameter with 100 2-inch tubes 60 inches long. Engines to set 9 feet, center to center and longitudinally with boiler. Pump required for this plant, one 400-horse-power pump, or a pump capable of delivering 3000 gallons per hour, and all necessary pipe connections. Each boiler to have one injector of 100 horse-power capacity, or equivalent to forcing 800 gallons of water per hour into boiler, and all necessary fittings.

In a plant of this size it is customary to use a feed water reservoir tank. Where there is no city water pressure the tank is supplied with water by a pump, the tank being suspended above the boilers, so that the water will flow by

third boiler to fourth and last boiler 9 inches; and from the last boiler to the engines the diameter is 10 inches. This pipe will carry all the steam which the four boilers can supply, and with a minimum resistance. Observing the end elevation, Fig. 2, the main steam pipe is at the extreme height. This arrangement allows of all condensed water flowing back toward the boilers.

There should be a drip connection placed on the gate valve just above the valve seat, so that condensed water may be drained off. By this arrangement of drip pipe, considerable water may be saved from getting into the engines. It will also prove to be economical and saving of steam from the boiler after the gate valve is opened; for, if this accumulating water is not let out at the boiler after any one of them has been shut down, the steam will con-

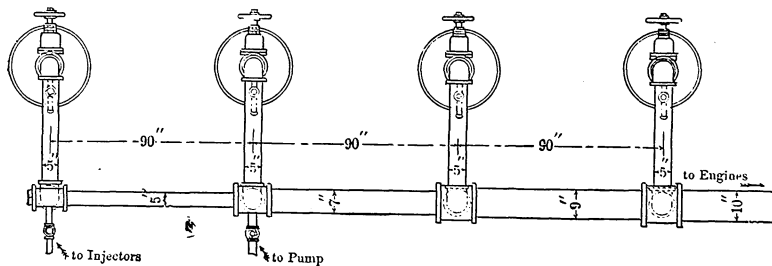


Fig. 1.—Plan View of Main Steam Pipe.

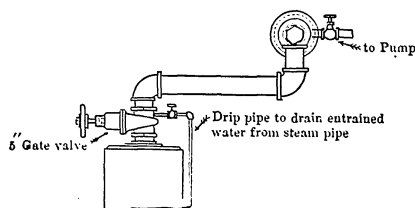


Fig. 2.—End View of Main Steam Pipe.

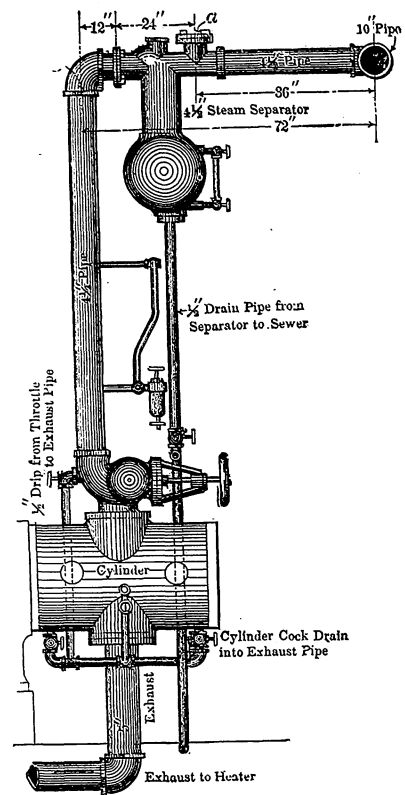


Fig. 3.—Steam Pipe Connections for Engines.

### PROPER CONNECTION OF STEAM BOILERS AND ENGINES.

stand pipe fitted to boiler, three gauge cocks for each boiler, blow off valve, two check valves, two stop valves for feed pipe, main gate valve for steam outlet, rocking grates, grate bearers, stack plate, rear arch bars and rear ash door and frame. These fittings go with each boiler. One boiler cleaner for all four boilers.

#### Engines.

Four 13 x 12 inch non-condensing high speed automatic engines, to develop 90 indicated horse-power each; diameter of steam pipe, 4½ inches; diameter of exhaust, 5 inches; diameter of pulleys, 54 inches; face of pulleys, 12½ inches; with complete set of fixtures, such as throttle valve, large size sight feed lubricator, full set of sight feed oil cups, and automatic oiling devices for crank pin and

gravity to the boiler feed pump, thereby keeping the pump valves flooded with water. One exhaust head should be connected to the main exhaust pipe after leaving the feed water heater.

The writer, after discussing the foundations for engines and boilers, considers the main steam pipe and fittings, Fig. 1.

We will first consider the correct diameter of the main steam pipe. As we have in this case four steam outlets from the four boilers, one from each of the boilers, and as the commercial diameter of each pipe is 5 inches, we shall require a main steam pipe with an area equal to four times the area of the 5-inch pipe. The area of a 5-inch pipe is 19.63 square inches. This multiplied by 4 gives 78.52, which is equivalent to a pipe 10 inches in diameter. The pipe is constructed on the telescopic method—that is, the diameter of the pipe from the first boiler to the second boiler is 5 inches; from second boiler to third boiler 7 inches; from

dense very rapidly. Of course, this is only a small saving of steam.

The main steam pipe is located 36 inches from the center of the dome. This is done so that when the steam pipe expands or contracts it will not make any strain on the screwed connection, but will naturally swing from the center of the dome, the center of the dome becoming the fulcrum of the main steam pipe. The steam pipe connections for the engines are made in the following manner, Fig. 3: A short piece of 4½-inch pipe is connected to the main steam pipe and then to the steam separator. The steam taking a spiral course inside the separator, causes the water to be thrown by centrifugal force against the outer walls, while the dry steam goes through the small holes to the center of the pipe.

The separator should be located as closely as possible to the engine, so that nothing but clean, dry steam will be supplied to the engine. The main steam pipe is located 72 inches from the 4½-

\* Abstract of discussion presented by Theodore F. Scheffler at the Montreal meeting of the American Society of Mechanical Engineers.



inch vertical steam pipe, which is connected directly to the engine throttle valve. This allows the 4½-inch horizontal steam pipe connected to the separator to swing from the elbow when expansion or contraction takes place. Fig. 3 also shows the exhaust pipe connected to the cylinder; for continuation of exhaust pipe, connected to feed water heater, see Fig. 4.

The best and usually the most convenient place to locate a feed water heater is on top of the boiler side walls,

heater on top of the boiler will cost a little more, but it will soon pay for itself by being economical.

The injector should have a separate feed water pipe, on entering the boiler, so that in case any accident should happen to the pump pipe connections, or repairs should have to be made on the pump or to any of the connections, there will be no loss of time by having to draw off the steam from any of the boilers, in order to make the necessary repairs. If necessary, by closing the

venient point which will be the nearest at hand, or may be carried to the sewer. To operate the blow off on the boiler or heater, the globe valve on the injector pipe should be closed. The injectors are supplied with water from the water tanks overhead; this will give a constant supply of water under a head of water at the injector.

The main steam supply is connected to the main line of steam pipe leading to the engines. The idea of doing this is in case anything should happen

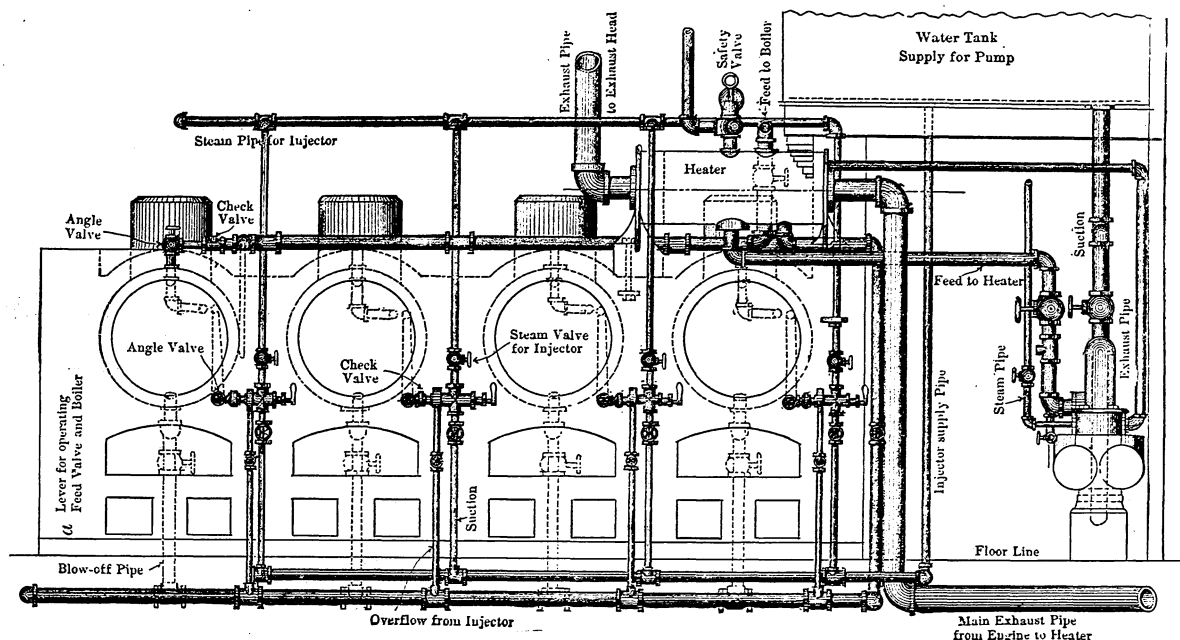


Fig. 4.—End Elevation.

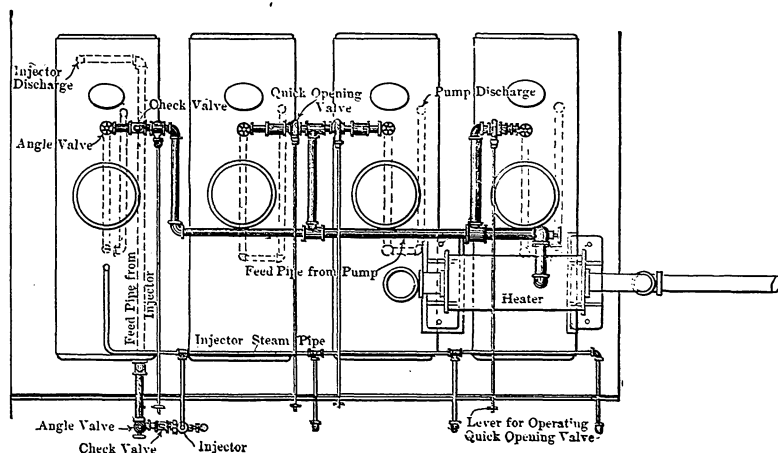


Fig. 5.—Plan View of Pumps and Feed Pipe Connections.

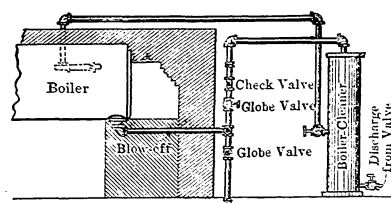


Fig. 6.—Boiler Cleaner Connection.

#### PROPER CONNECTION OF STEAM BOILERS AND ENGINES.

placed at right angles to the boiler and set horizontally, the heater being supported at each end by a cast iron leg or bracket, and each bracket anchored into the boiler side walls by anchor bolts.

This method of locating the heater has been used on several large boiler settings which the writer has designed. Any person who is in any way familiar with boiler settings knows how hot it is over the top of boilers and can readily see the advantage of locating the feed water heater above the boilers. From 5° to 10° of additional heat will thus be obtained for the feed water over that supplied if the heater is set up as in common practice. To set the

main feed water pipe valve connected to the pump line of pipe, after the water is forced through the heater, and by closing the feed pipe valve over each boiler, the whole line of pump pipe connections may be disconnected, and the boilers fed with the injectors. A check valve should be placed over each boiler for the feed pipe, and also between the pump and heater. This will keep all pressure away from the pump and will be beneficial in case anything should happen to the boiler checks. The blow off from the heater is connected to the main blow off pipe, as well as the overflow from the injectors, and the discharge may be connected to any con-

so that any one or two of the boilers should be off duty, the supply of steam would be constant, in taking steam from the main line of steam pipe. A good way to connect the blow off pipe to the bottom of the boiler shell and keep the pipe intact from burning out is to build a small wall of fire brick, about 9 inches thick, and lay the pipe in the center of the brick. This wall will not diminish the area of the combustion chamber enough to destroy any of the draft.

The exhaust pipes leading from the engines to the main exhaust pipe should be constructed so that there would be a minimum amount of back pressure. To

do this satisfactorily and with the best results, a lateral branch Y-connection should be made where the pipe meets the main exhaust pipe. A valve should be placed on the pipe leading to the main exhaust pipe, so that in case any one of the engines is stopped for repairs the exhaust steam from the other engines would not back up into the steam chest, in case the valve on the engine was disconnected from the engine. The Y-connection also does away with the short and sharp angle connection and makes a freer passage for the steam.

Referring to Fig. 5, we have a plan view of the pump feed pipe connections with fittings, also the injector connected to the boiler. It will be observed that the injector pipe runs nearly the whole length of the boiler and toward the rear before discharging the water directly into the boiler. The advantage of this is apparent. The feed water becomes well heated before discharging into the boiler, and its chilling action on the shell is greatly lessened. There has been considerable discussion about where the feed water should enter the boiler, and the writer believes that this method is freer from objection than any other which could be selected. The pump feed enters the boiler at one-quarter of the whole length of boiler at the rear, and the pipe is kept as close as possible to the boiler shell, so that there will be room enough for a man between the pipe and the top of the tubes. The pipe then continues ahead about 8 feet and then turns toward the boiler shell on the side, and then turns and comes back to where it started from and discharges downward. Some persons may say there are too many turns employed in this method, but the feed pipe is made much larger after it enters the boiler to reduce the resistance caused by friction to a minimum. Fig. 5 also shows a plan of the feed water heater.

Fig. 6 illustrates the method for connecting the boiler cleaner to the four boilers. The reservoir for receiving all of the sediment collected from the boilers is located centrally between the four boilers, in the rear. The action of the boiler cleaner is here described: As the water boils and circulates toward the top and rear of the boiler the scoops gather all sediment, which rises to the surface of the water and is then discharged by the boiler pressure into the reservoir. The water and steam may be let out of the boiler independent of the boiler cleaner when it is necessary, by closing the valve connected to the boiler cleaner and opening the valve connected to the blow off pipe proper. There is a globe valve attached to the bottom of the reservoir, where the sediment which has collected may be let out. This sediment should be let out every other day.

The writer says, in conclusion, that about 20 plants have been connected up as described in this article, although they have not all had boiler cleaners, nor has the injector been connected separately to the boiler, and the engines and boilers were arranged somewhat differently in the setting; but all are giving good satisfaction, and the piping in general was arranged as described here. Further, in regard to piping in general, in case of any accident to any part of the plant, the part which is crippled may be shut off without shutting down the whole plant.

The steam will reach the engine with but little drop in pressure, as all pipes are covered with an asbestos air space covering.

### Tests of Tandem Compound Blowing Engines.

In *The Iron Age* of June 7 last we presented an illustrated description of a pair of tandem compound blowing engines built by Mackintosh, Hemphill & Co. of Pittsburgh for the Monongahela Furnace Company of McKeesport, Pa. The tests of these engines were made by Daniel Ashworth of Pittsburgh. We wish to correct an error in the table entitled "Conditions and results of right hand engine." In the fourth line, "Initial pressure (high pressure cylinder)," the pounds should be 124 instead of 50.5.

The accompanying indicator cards, in connection with the data contained in our article above referred to, show the admirable working of these engines. The cylinders are 28 by 50 inches for the steam and 54 inches for the air, the common stroke being 60 inches. In Fig. 1 the revolutions were 44, scale 50, mean effective pressure 57 pounds and indicated horse-power 402.2. In Fig.

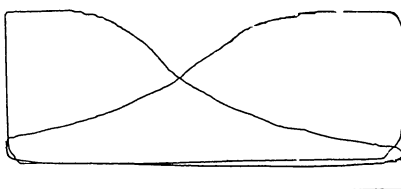


Fig. 1.—Card from High Pressure Cylinder.

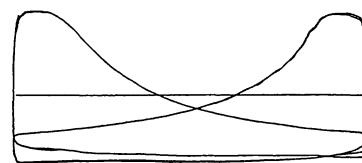
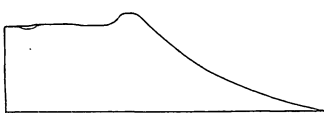
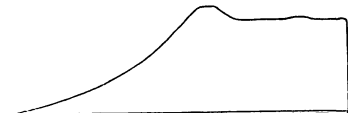


Fig. 2.—Card from Low Pressure Cylinder.



Back End.



Crank End.

Figs. 3 and 4.—Cards from Air Cylinder.

### TESTS OF TANDEM COMPOUND BLOWING ENGINES.

2 the revolutions were 44, scale 12 pounds, mean effective pressure 9.6 and indicated horse-power 240.9. In Fig. 3 the air pressure was 22, scale 20, revolutions 32, vacuum 26 and pumps 28. In Fig. 4 the air pressure was 23, scale 20, revolutions 38, vacuum 26 and pumps 28.

The Berlin Iron Bridge Company have appointed W. E. Stearns their purchasing agent, to fill the vacancy caused by the death of Wm. H. Riley.

The *Commercial Herald* of San Francisco says that it is a matter of general complaint among the merchants of that port who are engaged in the export trade with China, Japan, Mexico and Central America, that they do not receive as large and liberal orders as they used to do.

At Indian Head on Saturday a 12-inch Sterling shell, representing a lot of 50 offered for trial under the Government specifications, was fired at a Bethlehem plate which had previously passed all the usual tests. At 1500 feet per second, muzzle velocity, it passed clear through the armor, being subsequently recovered entire. The lot of shells was promptly accepted by the naval ordnance officers.

### Coking and Utilizing Black Band Ores.

A very valuable patent has recently been issued on the subject of coking black band ores, which process was worked out by E. A. Uehling and C. A. Meissner of Birmingham, Ala. The latter, as manager of the Vanderbilt Steel & Iron Company of that place, has been experimenting with Alabama black band ores since he has been South, and in discussing the subject with Mr. Uehling, the furnace manager of the Sloss Iron & Steel Company, it was suggested to coke the raw ore. The patent, mention of which was made in these columns some months since, is the result of these experiments, and covers the process of coking these carbonaceous ores, the resultant product being a coke interlaced with metallic iron, which may be used direct in the blast furnace or cupola, with proper mixture of ores and lime in the former, and pig iron in the latter, or the metallic particles of iron can be separated from the coke and

used in puddling or open hearth furnace, and the coke used in gas producers or under boilers.

The inventors are now experimenting on the subject on a large scale, and propose to utilize the black sands of Alabama for this process.

Mr. Uehling is well known to iron men as a practical and theoretical furnace-man and successful inventor, his latest and most remarkable invention being the pneumatic pyrometer for showing reliable continuous temperatures, even at considerable distance from the heat or cold giving source which it is desired to test. It has met with instant favor, and its reliable application to high and low temperatures makes it an exceedingly useful invention. Mr. Meissner is largely interested in iron and limestone properties in Birmingham, and is well known in Northern and Southern iron circles, especially on account of his interest in chemical research and the improvement in the iron business. He has been a pioneer in the Ohio Scotch iron development during his connection with the Brier Hill Iron & Coal Company of Youngstown, Ohio.

The general custom of roasting black band ores is to put the raw ore in piles of varying size and burn out all carbonaceous matter. If the pile is too high the iron melts and mats at the

bottom, making a mass similar in appearance and effect to molten cinder and having lost the valuable softening properties of black band ore. This mass is frequently so tough as to present serious difficulties to breaking it up even with dynamite. If the ore is roasted insufficiently a large proportion of the iron oxidizes to sesquioxide of iron, which decreases the value of the ore. The outside of all open air piles is in this shape and analyzes much lower than the partly or totally melted material. This insufficiently roasted mass forms a light powdery substance, causing loss in furnace by blowing out as dust in charging or in downcomer. The advantage of coking is therefore apparent. This retains the iron in metallic globules, distributed evenly through the coked mass, and there is hence less loss, as it enters the furnace in a more metallic state than if it were highly oxidized as in the old method.

The process saves 50 per cent. of the carbonaceous and volatile matter, the fixed carbon, and makes it available as fuel. If used thus in the blast furnace the intimate mixture of coke and iron will tend to produce a soft, highly carbonized pig and reduce coke consumption materially. When used in the cupola, a large excess of coke being present (about 1 part coke to 1 part iron), additional pig or scrap can be added without additional coke. When used in the open hearth or puddling furnace the product of the coke oven is crushed and separated, preferably by magnetic separation, leaving the coke available as a fuel to be sold as crushed coke, while the metallic iron is melted in the furnace.

The hardness of such coke will depend on the quality of the raw ore and the manner of coking. It should unquestionably be coked in a closed oven, drawn by machinery, and if possible the by-products should be saved. As soon as the experiments now under way have been completed a scientific and detailed account will be made embodying analyses and practical results obtained.

The success of this process will be of especial interest to the Ohio black band districts, which have been the main ingredients of the famous Ohio Scotch irons. The Alabama black bands will also be great beneficiaries by it, as they are quite rich and in fairly large veins and coke well, but have hitherto been neglected owing to the heavy loss of material in burning and the consequent high price of the material subsequently obtained.

At a conference held in Pittsburgh last week between the J. Painter & Sons Company, Lindsay & McCutcheon and representatives of the Amalgamated Association of Iron and Steel Workers, that part of the wage scale governing hoop mills was satisfactorily arranged. It is understood that the two firms named, who are the only concerns in the Pittsburgh district making hoops who recognize the Amalgamated Association, were granted concessions averaging about 10 per cent. On Thursday, the 21st inst., a conference will be held at Pittsburgh between the Executive Committee of the Association of Iron and Steel Sheet Manufacturers and a committee of the Amalgamated Association, at which time the scale governing wages to be paid in sheet mills will be taken up.

The members of the Engineers' Club of Philadelphia have planned an excursion to Reading, Pa., on June 30.

## CORRESPONDENCE.

### Steel Manufacture in the South.

To the Editor: In the issue of June 7 of *The Iron Age* Benjamin Talbot criticizes a paper that has been written by me and published also in your paper some time ago. I do not intend to dwell for any length of time on the first part of his article, up to where he discusses the case of the treatment of too high silicon iron. In this first part, indeed, your correspondent discusses some figures of my own simply by opposing his "opinion" or his "belief" without in the least trying to substantiate his opinion or to explain the figures that he opposes.

In my paper I stated that the presence of the raw materials in the immediate neighborhood of the works was the chief factor to obtain low prices. Of course, the Birmingham and the Tennessee ore and coal districts are such centers.

In speaking of manganese, Mr. Talbot calls the reader's attention to his "claim of extreme partiality for this most valuable metal in basic pig iron." I quoted myself in my paper the reason why manganese is valuable in the basic Bessemer iron, but I also said that if so high an amount as 1.5 to 2 per cent. cannot be obtained lower amounts will do, provided the sulphur is low enough, and I published a table showing the standard composition of the iron treated in some of the well-known European works, none of which treat iron with less than 1 per cent. of manganese. With some of the Southern ores containing as high as 3 per cent. of oxide of manganese, it is easy to obtain a mixture in the blast furnace yielding an iron with about 1.5 per cent. of silicon, and even less, perhaps 1 to 1.2 per cent. of manganese and less than 0.1 per cent. of sulphur.

Mr. Talbot further objects to the price of \$3.78 per ton of steel, but does not in the least justify his objection. He says, however, that many items are omitted, such as molds and stools, sleeves, nozzles, &c. On December 21, 1893, a completely itemized and carefully established price is given to that effect in *The Iron Age*. All the items that Mr. Talbot thinks are missing in my paper are enumerated there and amount to a total of \$0.677. I took 75 cents—undoubtedly high enough.

Of ferromanganese 15 pounds per ton of iron corresponds to  $\frac{1}{4}$  per cent., an amount that is largely used in European works.

As to the amount of dolomite and tar used per ton of iron, the quantities chosen are partly the result of personal experience and partly from experience gathered from European concerns. Mr. Talbot says that instead of 50 pounds it would be safer to take 100 pounds, without stating whether that is his personal experience at Chattanooga or not. If it is, then I must say that Chattanooga having been so to say only in the experimental stage, cannot very well be taken as a standard, and that the amount of dolomite and tar used in regularly running works will be much smaller than 100 pounds.

The price of \$12.35 to \$13, quoted as being the probable cost price, is not itemized at all and cannot be discussed.

In all the large European basic Bessemer steel works no mixer is used, unless it be for the purpose of desulphurizing. The iron, when no sulphur has to be removed, is taken direct from blast furnace whenever it is possible to do so.

This is well-known practice and need not be discussed. It is a different matter with the acid Bessemer, where ordinarily a much larger amount of silicon is required and more regularity, too, in that element.

As to the benefit derived from the sale of basic Bessemer cinder as fertilizers, I must acknowledge that I do not know much more about its real money value than Mr. Talbot does. The fact, however, that as a fertilizer it is very highly esteemed, makes me believe that it will constitute a source of greater value to the steel works than shown in my paper. In *The Iron Age* of December 21 a credit of \$1.50 is given to the ton of ingots attributed to the value of this slag. Though this may be the right figure, I wanted to be very conservative and put it down at 60 cents only. This figure is undoubtedly, if anything, too low.

At present I reach that part of Mr. Talbot's paper in which he discusses the possibility, suggested by me, of desilicizing iron before its final treatment in the basic converter. Here indeed Mr. Talbot seems to give full sway to his fancy by quoting from my paper things to which I never gave utterance. I said in my paper that an iron containing from 1.6 to 2 per cent of silicon with little sulphur can easily be made in the South. Then I said, furthermore: "Since the basic Bessemer process requires an iron containing about 0.3 to 1 per cent. of silicon the iron above mentioned would have to be desilicized before its treatment in the basic Bessemer converter. The only thing that really will be required in that case will be the removal of about 50 per cent. of the silicon contents of the iron, thereby obtaining a new iron with less than 1 per cent. of silicon. In other words, a white iron will be the result, which, having all the properties of a white iron, can be treated like it. In order to obtain such a result the following method could be followed: Every cast from the blast furnace could be run directly from the blast furnace into a kind of an acid converter where the required amount of silicon could be removed in a few minutes with the blast from the furnace blowing engine. This blowing can be done while the blast is stopped in the furnace to attend to the tapping hole. It can be done sideways near the surface of the metal, which would require very little blast pressure. When it is ascertained that the silicon contents has been sufficiently decreased, the metal, which is then white pig iron, or practically so, will be tapped from the desilicizing vessel and cast either into the ordinary pig iron molds or into an iron ladle to be taken at once to the basic Bessemer converter." Then I said, further: 2. "But if necessary it can be blown further and enough to remove nearly all the silicon and part of the carbon, whereby a suitable cheap scrap would be obtained to be used in the basic open hearth furnace," &c.

It is easy to see that what is recommended under the heading that I marked No. 2 in this paper has nothing to do with the basic Bessemer converter. The loss incurred by removing nearly all of the silicon and carbon will be about the same as in an ordinary Bessemer heat, and has been stated by me personally in an article published some three years ago as being about equal to 12 per cent. and the blow has been considered as lasting about 12 minutes. Since the cost prices established in my paper relate to the basic Bessemer converter, it is clear that article 2 cannot be applied. It has simply been mentioned to show

that if necessary cheap scrap iron can be obtained by it, a thing that is also very much required in the South.

Now let us see what will happen if we submit liquid pig iron to a blow of about four minutes in either an acid or basic converter, according to the nature of the iron treated. After about four minutes blow:

1. About 50 per cent. of silicon is removed in the acid converter, about 80 per cent. to 100 per cent. of silicon is removed in the basic converter.

2. A maximum of 20 per cent. of carbon is removed in the acid converter, much less in the basic converter, according to the quantity of manganese present (not necessary to explain here).

3. About 20 per cent. to 80 per cent. manganese is removed in the basic converter. In the acid it is generally less. According to this we shall have the following table:

	Original pig iron. Per cent.	After 4 minutes' blow. Per cent.
Silicon.....	1 to 2	0.5 to 1
Carbon.....	3.5	2.8
Manganese.....	1.2	0.4 to 0.6

It will be noticed that the analysis in the second column represents a white or mottled pig iron of good composition. Besides, on account of the combustion of part of the elements, silicon and manganese, in the very short time of four minutes, the temperature of the metal will be considerably increased, which will be an excellent thing. Where is Mr. Talbot's 10 to 12 minutes' blow? Four minutes are enough. An ordinary Bessemer heat lasts about all in all, from beginning to end of blow, 12 minutes, and mostly not more than ten minutes. In most cases the total loss of iron (decrease in weight) is about 12 per cent. If we consider that this loss is about equally distributed all over the heat we will have a very approximate loss of about 4 per cent., with a blow of only four minutes. I took 5 per cent. of loss. After Mr. Talbot has so gleefully rejoiced over these 5 per cent. loss, and after having even called the attention of every Bessemer steel manufacturer to that figure, he goes on and states calmly, in the same breath, that the loss of metal in the acid converter averaged 10 per cent. when desilicizing. To favor his reasoning I presume that he means to say that the removal of all the silicon, and silicon alone, imports a loss of 10 per cent. ? If, then, I propose to remove only one-half of the silicon, I think that Mr. Talbot will admit with me that the loss also will be reduced to one half, and not be more than 5 per cent. When I determined the loss of 5 per cent. I started from the assumption that for each unit of silicon burnt it takes theoretically about 4 units, both of iron and manganese, to form a singulo-silicate (von Ehrenwerth, *Abhandlungen ueber den Thomas-Gilchrist'schen Prozess*, 1879). So that if we remove one half of the silicon from a 2 per cent. silicon iron, we remove at the sametime 4 units of iron and manganese, or a total of 5. If we remove one-half of a 1 per cent. silicon iron, then we also will remove 2 units of iron and manganese; total, 2½. The average will be 3½ units for 1.5 silicon iron. Instead of 3½ per cent. loss I took 5 per cent., consequently I am entirely on the safe side.

In the same paragraph Mr. Talbot states that "the metal, being deprived of carbon and manganese, both heat elements, blows cold." To consider carbon as a heat element in a Bessemer heat is a jewel well worth while to have been discovered by Mr. Talbot. Mr.

Talbot probably has been informed that carbon when burning to CO<sub>2</sub> develops more heat than any of the elements. silicon, phosphorus, iron or manganese (when burning to CO it creates about three and one-half times less than when burning to CO<sub>2</sub>, and the greatest amount of it burns to CO), and he concludes that it is necessary in the bath as a heat creating element. If such is the case, will Mr. Talbot allow me in my turn to call the attention of the manufacturers of Bessemer steel to his great discovery? I will tell Mr. Talbot that carbon imparts little heat to the bath.

Furthermore, Mr. Talbot states that I proposed to use a "fixed" converter, and to reach better the end he has in view he supposes that it will be a 5 ton converter. That he did not find those statements in my paper need not be pointed out here. About two years ago there appeared an article to that effect in some Southern paper, and even without my knowledge a sketch of a rectangular large tipping converter that I had made and given to some parties over a year before the publication of that paper. No other proof need be quoted of what I intended doing.

Even a 20 or 25 ton vessel can be used. Enough metal could be desilicized in one single heat and reduced to a white iron to last for two or three heats in the basic converter. This metal being very hot after the blow and still being a pig iron, can be kept in the vessel for a long time, just as is done in a mixer.

The only thing that would be required would be to incline the vessel in order to lift the tuyeres out of the metal. Mr. Talbot also objects to blowing below the surface of the metal. This objection might have some importance if in a fuller description that I gave of this method some years ago I had not calculated myself the height of liquid iron that can be kept suspended by a blast pressure varying from 5 to 10 pounds. I showed then that for such a blast pressure the height of liquid metal that can be counterbalanced will vary from 18 5 to 37 inches. With such a height Mr. Talbot's description of the great oxidation of the bath is useless.

Mr. Talbot also discusses the cost figure of 10 cents for desilicizing, this price including labor, repairs, &c. For a 150 ton furnace this makes \$15 daily. For two 150-ton furnaces it would make \$30. Outside of the masonry repairs, one keeper and his helper will furnish all the labor required, with an expense of \$4, which will leave \$11 for repairs and bricks. If two furnaces are in use it would leave \$26, without mentioning the fact that when this iron is thus being treated in the converter and taken direct to the basic converter, all the labor that it would require to make the pig iron beds, to break and load the pigs on cars—in other words, the wages of the cast house men—will be saved. The wages that would have to be paid to keep the desilicizing vessel as an extra expense would undoubtedly be much lower than the wages that it would be required to pay to the cast house men. I think that Mr. Talbot will admit that. But if, nevertheless, we consider it as an extra expense, then the remaining \$11 spent for repairs will be nearly entirely made up by refractory materials for lining and work done on it. This makes 7.4 cents per ton for one furnace and 8.7 cents per ton for two furnaces.

I may call Mr. Talbot's attention to the fact that in Europe when mixers are used to remove sulphur it is estimated that the cost price of pig iron will be in-

creased by 3 cents only per ton. Of course they do not blow there. But to consider that, I took 10 cents here, which undoubtedly will cover it. No fuel will be required since blast furnace gases will be used to heat the vessel, and none will be required for the blowing engine other than what is necessary for ordinary blast furnace purposes. As to the failure of the duplex process (after having removed silicon and a large amount of carbon in an acid converter, the metal is carried to a basic converter to remove the phosphorus), I must remind Mr. Talbot that there will be a vast difference between what I propose here and the aforementioned process. My proposition consists in removing part of the silicon and obtaining thereby a metal which is still a thorough pig iron, as can be seen in the second column of the table published above. This metal, instead of being cold, will be considerably hotter than when it left the blast furnace. In the direct metal process which is used in Europe, whenever the local conditions allow of it, the metal has on an average the composition given in the second column of the table, with the exception of manganese, which is higher when it is easy to have it higher, but which is not always higher. Since I propose by my method to make metal similar to direct furnace metal the results will be the same, while the heat of the metal being considerably increased it will be more suitable for treatment in the basic converter, even without more manganese. Mr. Talbot says further: "The proposition to desilicize the metal, cast into pigs and remelt in the cupola is objectionable, as if the duplex basic Bessemer process cannot be run direct, then its only supposed charm is taken away."

The reason why I proposed this and why I have proposed it three years ago is the following: On Sundays, when the converting works do not run, or in such blast furnace plants where no converting works exist, desilicizing the metal to the extent proposed by me and then casting it into pigs constitutes a cheap method to obtain immediately a basic iron well suited for basic Bessemer purposes. This iron, of course, will have to be remelted in the cupola. Does Mr. Talbot still think that this idea is so very objectionable?

Mr. Talbot also makes the remarkable statement, of course based on his fancy figures, that the proposed method will each day occasion a six hours' stoppage of the furnace. If we consider a 20 or 25 ton vessel, this would require six casts from the blast furnace in 24 hours, or 12 if two furnaces work. As each furnace has at least one blowing engine, we need not consider the case of two furnaces. Six casts, each requiring a four-minute, even five-minute blast, make half an hour. If we admit that a blast furnace casts four times a day, or even only three times, and that at such times the blowing engine is always stopped for at least five minutes, the extra blowing would really give a loss of one-quarter hour, instead of the six hours that Mr. Talbot calculated.

The advice that he gives me a little later on, to take in the case of a 10 or 15 ton blow a "tipping" vessel instead of a "fixed" one, when he does not find the word "fixed" in my whole paper, and when I had myself in a previous article proposed to take a "tipping" converter, is really too amusing to be discussed any further. A little further on he says again that it is his "impression" that ingots could not be made by the duplex basic Bessemer process from \$7.25 metal for less than \$15 to \$16. As long as he does not jus-

tify his statements by his own past experience or by past experience that is known to everybody, or if he speaks of a step that is new, as long as he does not explain the figures resulting therefrom in a rational way so that they will stand examination, his whole impression is of no value at all. As to his other remarks about the duplex process where the metal is finished in an open hearth furnace and where he brings in his phosphide of iron theory without the useful amount of carbon, I refer him to a paper read by Dr. Wedding of Berlin, Germany, at the Pittsburgh International Session, October, 1890, of the American Institute of Mining Engineers, entitled "The Progress of German Practice in the Metallurgy of Iron and Steel," &c. He will see there that at Hörde the Thomas basic Bessemer and the Martin process are combined (in other words, basic Bessemer and open hearth). In those works the metal in the basic converter is blown down until it contains only 0.3 per cent. of phosphorus, then it is "conveyed in a ladle to the open hearth, there to be finished. One furnace can easily work eight to nine such heats in 24 hours, and the Thomas metal is thereby converted into excellent open hearth iron." The iron used at Hörde for this practice has the following composition: 0.58 silicon, 2.75 phosphorus, 1.57 manganese, 3.60 carbon and 0.079 sulphur. When this metal is blown down in the converter until it contains only 0.3 per cent. of phosphorus, if Mr. Talbot will be true to his opinion that carbon is removed in the basic Bessemer converter before the phosphorus, which is perfectly right, he will admit that when the phosphorus is diminished down to 0.3 per cent. no carbon will be left in the bath. If I propose to "practically eliminate it all," then I can indeed be very proud to "fall into the error of other experts" when I find among those experts the Hörde Steel Works and such men as Dr. Wedding.

Before concluding, however, I wish to make a few more remarks in regard to Mr. Talbot's so-called invention. If that gentleman means to say that he invented a method by which he is able to desilicize and dephosphorize liquid metal by mixing it intimately with basic cinder from a basic open hearth furnace, cinder that has already been used to that purpose or which is rather the final result of such a proceeding, he must show the result of tests made therewith. Such tests, if I am well informed, have been made by Mr. Talbot in Pittsburgh, and the results when published by Mr. Talbot would be a more convincing proof than any indefinite statement that he may make about it. I must also state that, so far as I have been informed, instead of removing phosphorus in those tests he increased it.

But when Mr. Talbot speaks of tests that he made in the South and in which tests he used a mixture of fine iron ore and basic cinder to remove silicon and phosphorus from liquid iron, I cannot help thinking that it looks very much like the Krupp washing process which is in use since 1877, and has given good results. In this process, which was fully reported on by the late A. L. Holley before the Institute of Mining Engineers in 1880 and which is in use in this country, liquid iron is desilicized and dephosphorized by its intimate contact with a mixture of rich iron ore and basic slag. In presence of these facts does Mr. Talbot still consider himself as the inventor of that process? Whether or not such is the case, everybody who wishes can make use of the Krupp

washing process, when he has been allowed to do so by the rightful owners.

J. B. NAU.

ALLEGHENY, June 15, 1894.

#### Economical Heating with Oil.

*To the Editor:* The strike of the coal miners has not been altogether without good results, for it has proved that the average American furnaceman is equal to any ordinary emergency. He had always used coal, and knew nothing about the use of oil except that there was a question as to whether its use for heating or melting was more or less economical than that of coal. As long as he had coal he was content to let others work at the problem, but coal having failed, he attacked it promptly and vigorously as one whose solution is of vital importance to him, and the various expedients adopted with more or less success throughout the country have thrown a flood of light on the subject.

Some people have succeeded in making good gas by dropping oil into producers burning a small quantity of hard coal, others by spraying it with steam into producers burning a small quantity of soft coal. Others again have sprayed it directly to the furnace by means of high pressure steam. For a long time it has been known that oil sprayed by high pressure steam gave more satisfactory results as a fuel than if air were used as a medium for producing the spray. Why is such the case? It seems absurd that the addition of water, even in the condition of high pressure steam, to fuel should improve its combustibility. The theoretical efficiency of pure oil as a fuel is certainly greater than that of a mixture of oil and water, not only because the temperature obtainable by its combustion is much higher, but also there are fewer waste gases to carry off heat. On account of the high specific heat of steam it takes but a small amount continuously going into the stack at a high temperature to carry off in a year as waste heat that produced by the combustion of a great many gallons of oil.

Even with this manifest waste, oil sprayed with high pressure steam seems to give better results as a fuel than if sprayed with air. This is an apparent paradox, but there must be a good reason for it, and a short consideration of the nature of oil will reveal it. At the ordinary temperature of the air, fuel oil is a rather thick, sluggish liquid, and is not readily divided into a spray of sufficient fineness to give best results in combustion. If, however, it be heated to the temperature of high pressure steam it becomes much more fluid and is readily changed into the finest kind of spray. This is then the keynote, and the apparent paradox is carried not by steam, but, in spite of it, by the heat it carries.

The secret then of the economical burning of oil is to spray it hot. This is best done by spraying with air previously heated to a high temperature by the waste gases.

H. L. GANTT.

PHILADELPHIA, June 14, 1894.

It is said that the Fall River mills will pay their dividends this quarter, notwithstanding the impression to the contrary which has prevailed.

Mayor Hopkins of Chicago has issued a proclamation calling upon the people of the city to send him contributions of money, food and clothing for the relief of the strikers at Pullman.

## THE WEEK.

The engines of the new United States cruiser "Cincinnati" were given a dock trial last week in the Brooklyn Navy Yard, with very satisfactory results. The "Cincinnati" was designed and built by the Government. Her engines develop 10,000 horse-power and are expected to make over 20 knots on her official trial.

Pekin will shortly be connected by direct wire with St. Petersburg, and so with the telegraph system of the entire world.

At a fire in Dubuque, Iowa, last week, 22,000,000 feet of lumber were burnt up.

The importation of hay from the United States into Great Britain is becoming a very important branch of trade. According to the British Board of Trade returns for April, 1894, 84,208 tons of hay were thus received during the four months ended April 30, as compared with 28,096 tons in the corresponding period of 1893.

Great interest is felt in the criminal proceedings taken by the District Attorney at Washington against the newspaper correspondents who refused to testify before the Senate Investigating Committee, now sitting to inquire into what is known as the "Sugar Scandal." Indictments have been found against the correspondents, and they will be tried in the Criminal Court.

Prospects for the Southern tobacco crop are held to be promising.

The British Board of Trade returns for the month of May do not, says the *Economist*, give much encouragement to the theory that the trade of Great Britain is reviving, since there is a falling off on both sides of the account as compared with the corresponding month of last year. In imports the shrinkage amounted to \$12,980,000, the falling off being most marked in textile materials. Exports were \$1,622,400 less than in May last year.

The collapse of the Coxey "army" has been complete and ignominious. Coxey himself, having been released from jail, has taken to the lecture platform.

The St. Louis *Globe-Democrat* records that the first carload of new wheat has been marketed in Oklahoma at 40 cents a bushel.

The recent floods in Oregon have caused serious damage to the uncompleted Cascade Locks, on which the Federal Government has expended more than \$2,000,000 in the 18 years since work on them was begun. The works narrowly escaped total destruction, and as a result the plans will be altered to obviate a similar danger in future. The change will involve an estimated cost to the Government of about \$5,000,000.

A boycott has been declared by the Western Passenger Association against the Lake Erie & Western Railroad for alleged cutting of rates.

Tariff riots have occurred at St. Johns, N. F. Last week a mob attempted to seize the bonded stores, and were dispersed with difficulty by the police and military, a number of persons being badly injured.

A dispatch from Winnipeg, Man., announces the discovery of a great deposit of auriferous ore between Rat Portage and Port Arthur, 70 miles south of the Canadian Pacific Railway.



# The Iron Age

New York, Thursday, June 21, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, - - EDITOR.  
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

## Features of the Coal Strike.

The coal miners' strike is ending in about the usual way. Some districts have been able to secure the advance for which they contended, others got no advance and some figure out an actual reduction. The national leaders have lost their prestige and in those districts in which no substantial advantage has been gained it would hardly be safe for them to put in an appearance. For nearly two months the miners and their families have endured pitiful privations and now find themselves too often burdened with an indebtedness which will require months of the most pinching economy to discharge. Meanwhile their reflections must be bitter against the foolish leaders who ordered the unions under their control to strike. But particularly bitter must the reflections be of those miners who had no personal grievances and merely struck through sympathy, in the belief that a general suspension of coal mining would end the strike very quickly. They were greatly deceived in their estimate of the stocks of coal above ground and the supply available from mines not yet under control of the unions. Coal consumers themselves have doubtless been surprised to find that so long a strike could be experienced without much more serious results occurring from the scarcity of fuel.

A lesson of this strike, therefore, and one which should be taken to heart at this time by other workingmen in danger of being beguiled by seductive agitators, is the very long time needed to make the strike felt by any considerable proportion of the public. A stoppage of the mines for a week or two was expected to check all business and create a formidable sentiment in favor of the quickest means to settle the strike. Such a short suspension of work was a holiday, and the miners threw down their picks with alacrity. Had they known that nearly two months would be permitted to pass without a general wail of distress from consumers, it may be doubted whether they would so cheerfully have courted the uncertainties of a strike. No matter how necessary their product may be, the workingmen in any line will find a period of business depression a poor time for entering upon a strike with any expectation of gaining substantial benefit.

In this connection some interest attaches to the great labor convention held at St. Louis last week. At that

convention it was resolved that all labor bodies in the country shall be amalgamated, or at least brought together in such friendly relationship that they will render efficient support to one another in time of need. It will be observed in the published reports of the proceedings that conspicuous mention is made of the railroad associations. Other labor leaders have long desired close relations with railroad unions in order to use them sympathetically in support of strikes in which they are not immediately concerned. Had such relations been established before the coal miners' strike, for instance, the railroad unions would have been expected to co-operate by refusing to haul coal from mines still running. This is regarded as a weak point in the position of labor and every effort has been made to strengthen it. The railroad unions have hitherto preferred to remain independent. Should the St. Louis project be consummated, they will hereafter form part of the general labor machinery. Labor organizations may well rejoice in winning such an ally. If railroad men act in complete concert to assist a strike, by preventing the hauling of material or supplies under ban, a most formidable influence is brought to bear. But it is really more formidable in appearance than it would prove in practice. Railroad unions would be called upon to bear a hand in so many strikes that they would very soon grow weary of their constant shouldering of other people's burdens.

## The Farm Machinery Trade.

The prospects are not favorable this year for a heavy demand for iron and steel from manufacturers of agricultural implements. An important meeting was held last week in Chicago of representatives of large concerns in this line, at which the outlook for future business was thoroughly discussed. It was decided that the short crops now almost certain in the greater part of the West, together with low prices ruling for all kinds of farm products, would have a bad effect on the agricultural implement trade. The manufacturers think it will be better to lessen the output of goods than to precipitate a cut throat war in prices in the attempt to sell their usual production. An effort will therefore be made to secure the co-operation of all the leading manufacturers in the support of an agreement to curtail factory outputs and maintain a profit price. While this seems a sensible course to pursue, in view of the fact that prices of farm machinery are very low, yet the adoption of such a policy will be very severely felt by iron and steel manufacturers. The farm machinery trade is a great interest, which has wonderfully expanded in recent years, and has helped in no slight degree to compensate iron and steel manufacturers for the falling off in their railroad business. The

curtailment of consumption which is foreshadowed by the action just taken, is unwelcome news, and it is to be earnestly hoped that conditions may change and implement factories be able to work up to something like their normal capacity.

## Cultivating Foreign Markets.

The great increase in our exports of manufactured goods during the current year causes much favorable comment. It is, indeed, a pleasant feature of our foreign trade. The more goods exported the less gold must be shipped out to cover balances. Probably little or no profit is realized on a considerable part of the merchandise thus disposed of, but the home market is certainly relieved to the same extent, and it is to be hoped that the foreign trade in American goods may continue to make great gains. It is amusing, however, to see the importance attached to this subject by some of our contemporaries. They invariably use a magnifying glass when they search into the influences radiating from exports. They tell us that if our manufacturers will only cultivate foreign trade they will never again suffer from so severe a depression as they recently were forced to endure and for which their confinement to the home market was responsible. Do these sanguine writers ever stop to consider the magnitude of our manufactures and the very great exports which would be necessary in order to place a proper share of the support of our industries on the shoulders of foreigners?

Take steel rails, for instance. This country in 1887 turned out its maximum product, reaching 2,101,904 gross tons. In 1890 the closest approximation to these figures was reached, when 1,867,837 tons were produced. The average annual output for 1888, 1889, 1891 and 1892, which may be deemed years of normal trade, was 1,412,017 tons. In 1893, when the country was in a state of collapse, the total production was only 1,036,353 tons. Now, to make our trade as large as our capacity would permit, it would be necessary to find annually a foreign outlet for 500,000 to 1,000,000 tons. And where could markets be found for such a huge quantity of rails when Great Britain and Germany and Belgium are ransacking the earth to dispose of their moderate surplus output? But Great Britain, with her great foreign trade, seems to be in no better condition than the United States. Her rail mills have made as high as 1,235,785 tons in one year, but in 1892 they only turned out 535,836 tons and in 1893 only 579,386 tons, or less than half of an easily attainable production. The same showing could be made in other branches of the iron and steel industry, and would doubtless hold good in general manufactures. Our industries are on such a large scale, as our home market is so great, that nowhere on earth, until there is a universal



"boom," can outside markets be found of sufficient size and importance to act as a mainstay for us if the domestic consumption suddenly dwindles through the disorganization of business. It is a misfortune of being too big.

### Electrolytic Brands in the Copper Trade.

The enormous development of the production of electrolytic copper has had its marked effect upon the relation between consumers and producers of that metal. When first electrolytic brands appeared upon the market, they were grudgingly given a place between the standard Lake grades and the casting coppers. They had to overcome both the prejudice of consumers and the drawbacks incident to the effect upon quality of early development work of a technical character. Those who appreciated the possibilities of the new method of separation foresaw that the long continued, uncontested supremacy of Lake copper would be shaken by the new metal. Their predictions have been verified by the happenings of the last year or two, and the fact is recognized in the metal trade that for nearly all uses electrolytic copper meets the requirements. This victorious advance, so far as quality is concerned, has been coupled with an aggressive policy commercially which has worked against the leading Lake copper interests.

One by one the great Montana companies have swung into line either as makers of refined electrolytic copper or as large contributors of raw material to allied or identified Eastern electrolytic refining interests. They have been powerfully aided by the use of the Bessemer converter as a means of turning matte into anodes. The great electrolytic plants at Anaconda, Great Falls, Baltimore, Bridgeport and Newark have steadily increased in capacity, not to speak of smaller works at a number of other places. All these producers have been improving quality of product and have uninterruptedly invaded territory among consumers which was once sacred to the Lake mines. They have been forced to cut prices to a greater or less extent under the plane of their old established rivals. They have been the leaders steadily until the great Lake mines have been forced to retaliatory measures.

The recent large sale of Lake copper to consumers at 9 cents per pound marks another step in the struggle. Except during the panic last year so low a price has never been made. It was not even attained after the great collapse of the French syndicate, or during the famous export sales, based on the Chili bar sliding scale. Low as 9 cents for Lake copper appears to be, it is pretty certain that even that price could not be secured abroad, where the frightened copper trade has allowed prices to drift close to £38 for G. M. B. Since that price is only equivalent to 8.25 cents, American

exporters of copper would have to be content with considerably less than they could sell for at home.

The main cause of this great decline in copper is the inability of consumption in this country to cope with the large production. The May returns are heavier than expected, because it was believed that since the Anaconda made only about 8,000,000 pounds in that month, the product would show a heavier falling off. This we understand was counterbalanced to some extent by the fact that some Lake mineral, hitherto withheld from the refinery, was pushed through. It is estimated that the current consumption in this country is somewhere between 60 and 70 per cent. of the normal quantity. This is an improvement over the second half of 1893, but it still leaves us with a large exportable surplus. Although consumption is heavy in Europe, the markets there have been unable to hold up against the deluge of copper from this side of the Atlantic and are staggering along in constant fear of further heavy shipments. Until the American copper trade begins to take for home consumption considerably larger quantities than it has dealt with recently, or until the producers decide that it does not pay to run to full capacity, the metal must continue to drag along at low prices. It will probably be found that soon electrolytic brands will start again with their usual campaign, and then even 9 cents may seem a good sale for Lake brands.

The suggestion is made from a practical source that the cheapness and very great abundance of wrought scrap should stimulate the growth of the manufacture of open hearth basic steel. Manufacturing consumers have been so widely educated to the use of steel that it can now be safely claimed that steel has the preference among all classes of consumers. This is shown by the persistent demand for steel, notwithstanding the higher cost of billets has latterly made steel in some forms considerably dearer than iron. Until wrought scrap advances materially in price, the production of open hearth basic steel could be conducted on a very cheap basis, while the high quality of the product would probably enable it to command a slight if not a good premium over competing products by other processes. An open hearth basic steel plant would seem to be very suitable for moderate sized rolling mills whose owners prefer to control their own supply of raw material instead of purchasing billets. The development of this branch of the steel industry would solve the problem now growing serious, of what is to be done with the steadily growing stocks of wrought scrap.

A large vein of excellent coal is reported to have been discovered near Brule, Wis., midway between Ashland and Duluth. The vein is said to be 6 feet thick.

## Washington News.

(From our Regular Correspondent.)

WASHINGTON, D. C., June 19, 1894.

### Triple Screws for War Vessels.

The performance of the "Minneapolis" on her recent preliminary trial by the contractors has aroused the greatest interest among naval experts and foreign *attachés*. The official contract trial, which will take place about July 9, it is expected will eclipse the speed of the "Columbia," which made the greatest speed of any vessel of her size in the world.

The opposition which Commodore Melville, Engineer-in-Chief of the Navy, encountered when he proposed the three screws for the "Columbia" when designed in 1890, was mentioned in *The Iron Age* at the time. The gratifying results of the "Columbia" established the complete triumph of Commodore Melville. In a pleasant conversation on the subject of his achievement in the "Columbia" and "Minneapolis," he said:

They were designed to be the fastest vessels of the cruiser type in the world. The "Columbia" has already attained that position, as no other vessel larger than the torpedo boat class has ever made 22.8 knots, the speed which she attained, and no other vessel, either of the torpedo boat or any other class, has maintained such an average speed for four hours.

I was disappointed that the machinery of the "Columbia" was not worked to its full power. It is expected that the full 21,000 horse-power for which the engines were designed will be obtained in the "Minneapolis." She ought to do better. The contractors are confidently claiming at least 23 knots and possibly 23½. I believe she will do it.

The main object was to reduce the size of the shafting necessary. The "New York" was designed for 16,000 horse-power expended through twin screws; she had four sets of engines, two on each shaft, which multiplied the number of parts rather more than was desirable, and the shafting abaft the after engine had to be just as large as if all the power had been put in through a single large engine. As the "Columbia" was to develop 21,000 horse-power, it would have required shafting capable of transmitting 10,500 horse-power if twin screws had been used, while with triple screws each shaft would only have to transmit 7000 horse-power, which was less than the horse-power going through a single shaft in the case of the "New York."

The trial of the "Columbia" showed a decided increase of economy. The comparison was made according to Froude's law between the "New York" and "Columbia." The "Columbia's" advantage in economy was 10 per cent.

The commodore added that the use of multiple screws for propulsion is not new. He gave a succinct and comprehensive history of the subject, which on the eve of the "Minneapolis" crowning achievement of speed is full of interest. He said:

During the Civil War a number of light draft boats used on the Mississippi River, familiarly known as tin clads from their carrying a very thin armor of boiler plates, were driven by four screws. The use of multiple screws, however, was adopted because it would have been impossible to fit one or two screws of sufficient size to secure the

propulsion. The Russian circular monitors, known as "Popoffkas," built in 1874, had six screws. These were failures, so that nothing definite could be told as to the advantage of the use of multiple screws. In 1880 the Russian Imperial yacht "Livadia" was fitted with triple screws, doubtless on account of her peculiar shape, since she was 246 feet long and 153 feet broad by only 7 feet mean draft. The "Livadia" proved a failure. In 1884 and 1885 the French Government made some elaborate experiments on a small steam launch fitted with triple screws. As a result the "Dupuy de Lome," 6300 tons, was built with triple screws. Her official trials, owing to an accident to one of the boilers, were interrupted and have not yet been completed. In 1887 a torpedo cruiser called the "Tripoli" was built for the Italian navy. She is 800 tons, and the performances of the triple screws in every case were satisfactory. Several other vessels of similar type have also been built for the Italian navy with triple screws.

The "Kaiserin Augusta" of the German navy is the only triple screw vessel of large size whose trials had been completed before those of the "Columbia." Her displacement on trial was 5000 tons and her horse-power about 12,600, so that in both respects she is much below the "Columbia" and "Minneapolis," which have a displacement of 7350 tons and a horse-power of 21,000. Besides the "Dupuy de Lome" the French are building several ironclads which are to have triple screws.

England alone stands off. She is building the "Powerful" and "Terrible," with about 30,000 horse-power each, with twin screws.

The Director of Naval Construction in England, however, says that they are not as yet sufficiently convinced of the superiority of triple screws over twins to cause them to adopt this method of propulsion. If the "Minneapolis" proves as successful as is now anticipated, her record, with that of the "Columbia," will certainly compel all other countries to adopt triple screws for large powers.

#### The Tariff.

It looks now as if the tariff debate will collapse within a week or ten days. The final stages in conference will be where the bill will be really made up. After a few non-concurrences the majority in the House may be expected to quietly wheel into line and vote for the bill.

#### The Armor Trouble.

When the committee investigating the armor irregularities at the Carnegie works make their report, it looks now as if Superintendent Cline and Workman Sill will not appear as the shrewdest men in the world on armor plates.

There is no doubt in official circles that there existed gross irregularities at those works, but not as laid down by Cline and Sill. They are way off in their reasoning. The Department has a statement which will be submitted at the proper time.

#### PERSONAL.

S. Allen Richards, recently superintendent of the blast furnace at Duluth, has removed to Sharon, Pa., to manage a blast furnace at that place.

Edward L. Ryerson of Joseph T. Ryerson & Son, Chicago, will shortly sail for Europe to spend the summer.

Charles N. Butler, C. E., of 611 Mutual Life Building, Philadelphia,

patent attorney, has been engaged to lecture during the coming winter at the School of Industrial Art, Philadelphia, on the law of patents.

W. H. Wallace of W. H. Wallace & Co., iron and steel merchants, of New York, is traveling in Europe. He left early in this month.

It is rumored that Robert P. Linderman, president of the Bethlehem Iron Company, is to be elected president of Lehigh University.

#### Manganese Ore in Russia and Greece.

In a late report to his government the British Vice-Consul at Poti, in the Caucasus, makes the following statement in regard to the production of manganese ore in that district: "The Caucasian manganese appears able to compete with that of any other part of the world, and is largely shipped, not only to England and the Continent, but also to the United States. Last season did not, however, prove a profitable one to those engaged in the trade, partly on account of the drop in prices owing to the anticipated opening of the railway to the mines, partly because of bad trade in England and America. The new narrow gauge railway from Chiatur to Sharopan was opened during the autumn, but frequent landslips and the want of sufficient rolling stock have hampered its operations, and it does not appear probable that for some time it will be able to bring down nearly all that is mined. Ultimately the effect will be to divert the trade entirely from Kvirili, its present headquarters, to Sharopan and Chiatur, the termini of the branch line." Another agent of the British Government, James Boyle, in a report on the trade of the Laurium district of Greece, shows that the production of manganese ore in that district amounted in 1893 to 178,098 tons. In connection with the subject, Mr. Boyle makes the following observations: "It may interest buyers in the West of England to know that new discoveries of large lodes of manganese iron ore are rendering it very abundant. Attention should also be called to the fact that the best of these ores is often slightly impregnated with arsenic."

#### Cast Iron vs. Forged Soft Steel Brake Shoes.

Charles T. Schoen has written to the *Railroad Gazette* a letter on the relative merits of cast iron and forged soft steel for brake shoes. He says:

The question as to what metal is best adapted for use for brake shoes is of vastly more importance than one would suppose, if only a passing thought be given it. The main points to be considered in deciding the question are: First, economy in wear, considering the first cost of each; second, relative wear of wheels; third, the coefficient of friction or retarding power.

It has been demonstrated by tests in service that one brake shoe made of forged, soft, low carbon steel will outwear about seven cast iron shoes; or, in other words, the wear is 1 pound of soft steel shoe to 8 pounds of the cast iron shoe for the same service. This answers the first question to be considered in favor of the soft steel shoe, because the cost of it per pound is but three times that of cast iron, while the demonstrated practical value is eight times.

The second proposition is the rela-

tive wear of wheels, and there has been room for doubt whether the soft steel would not wear the wheel faster than cast iron; this doubt comes from the fact that friction has generally been connected with wear, the assumption being that the greater the wear the greater the friction, but this is now known to be dependent upon the nature of the material. The results, from a long period of tests, show that soft steel does not wear steel tires or chilled wheels any more than, and not as much as, cast iron shoes. The reasons for this are obvious: The steel shoes to wear the wheel faster than cast iron would have to be harder, but the fact is they are softer, having only 0.10 carbon. The question naturally arises, If the steel is softer, how is it that it only wears one-eighth as fast as cast iron? The answer is simple, and embodies the secret of the economy of the soft steel shoe. Soft Bessemer steel is homogeneous, and the molecules, although soft, hang tenaciously together and resist separation, so that they are not readily pulled apart by the friction, thus reducing the wear. Cast iron, on the contrary, is not homogeneous, and the molecules are not held together with anything like the force that exists between the molecules of soft steel, and the particles separate easily and fly off, just as the particles fly off from emery wheels. In other words, the real cause of the excessive wear of cast iron shoes is the waste occasioned by the separation of the particles from each other, and the falling off without having performed any really useful function in braking.

The third question about the coefficient of friction, or retarding power, is one that is still unsettled. The reports of tests show that the retarding power of the soft steel is as great as, if not greater than, that of cast iron. Yet we can easily see how the retarding power would not be as great with hard steel shoes as with cast iron, but on this point it is well to wait for the data from the M. C. B. Committee on Laboratory Tests before going too far in reaching a decision as to the coefficient of friction.

Besides other incidental advantages of a long wearing soft steel shoe, there is the all important one of the less number of times the shoe has to be changed, and the decreased inspection required to keep up the slack.

#### The Haskell Gun.

After nearly two years spent in its construction the Haskell multicharge steel gun has at last been completed at the Scott Works, Reading, Pa. It is to be sent at once to Sandy Hook for trial by the Government experts. The steel of which the gun is composed was made at Bethlehem, and special machinery was made to finish certain portions of the gun. Congress made two appropriations of \$55,000 and \$53,000, respectively, for the manufacture of Colonel Haskell's invention. Including the cost of projectiles, carriage and testing, the total cost of the trial gun is estimated at \$120,000. A special feature of this weapon is two powder pockets along the chamber, beside the breech. The gun weighs 35 tons and is 35 feet 2 inches long. The diameter of the bore is 8 inches.

It is announced that plans for a railroad bridge across the Delaware River, near Philadelphia, will be prepared at once and work begun on the structure as soon as possible.

## MANUFACTURING.

### Iron and Steel.

The tinning house recently erected by the Aetna Standard Iron & Steel Company, Bridgeport, Ohio, has a capacity for tinning about 900 boxes of black plates per week, the outfit consisting of three sets, one forterne and two for bright plates. This firm do not expect, however, to put any coated plates on the market until about July 1. Their black plate mills have been in operation for about ten days, working up stock for the tinning house. Their rolling mill proper is working to about two-thirds capacity on natural gas, the remaining portion being off on account of the coal strike.

A scheme of improvements has been decided upon by the Radford Pipe & Foundry Company of Radford, Va., the object being a very considerable addition to the working capacity of the plant. The principal improvements in contemplation consist of an additional pit; considerable increase in the equipment of present pits; a new cupola of largest capacity (96-inch shell); additions to boiler capacity and to the track system within the works; an overhead traveling crane in the special foundry; a large steam crane for hoisting pig iron to the cupola platforms; additional coal and coke trestles, &c. The Radford Company have pushed their plant to its fullest capacity since February on orders from the East. Contracts have already been let for part of the improvements. It is estimated, when completed, that they will very nearly double the daily output of pipe and special castings.

The Drexel Railway Supply Company, The Rookery, Chicago, have leased the buildings of the Treat car wheel plant, at East Chicago, Ind., and will fit them up for the manufacture of steel castings, principally car couplings.

The Sylvan Steel Company of Davenport, Iowa, have contracted for much of their machinery, and specifications are under way for the buildings, which are to be substantial iron or steel structures. They will manufacture agricultural shapes from old steel rails. George Tatnall of Pittsburgh has been appointed superintendent.

The charcoal furnace of the Picton Charcoal Iron Company, Limited, of Bridgeville, N. S., was started toward the latter part of last month. A new bolt washer and three charcoal kilns have been added to the plant.

Julian Kennedy, mechanical and consulting engineer, of Pittsburgh, has received a contract for the erection of a blast furnace for the Salem Iron Company, Salem, Ohio, to be 17-foot bosh and 74 feet high. The contract calls for the completion of the furnace in four months.

The Brown Mfg. Company of Pittsburgh have made application for a charter of incorporation, the incorporators being Howard Childs, Fred. H. Brown, W. C. Sutherland and others. The new concern propose to engage in the manufacture of iron, steel, &c.

When Hubbard Furnace of the Andrews & Hitchcock Iron Company, Youngstown, Ohio, was closed down in April last the concern had piled up in their yards 15,158 tons of pig iron, from which there was shipped in April, 3214½ tons; in May, 5617½ tons, and up to June 16, 4829½ tons, or a total of 13,661 tons, leaving in stock at the close of business on June 16, 1497 tons. The above shipments of iron have been distributed to 375 foundries. The iron going forward faster than usual on account of the coke strike and the advance in freight rates which took effect on Friday, June 15. No. 1 Furnace of the above concern is ready to be put in blast at any time, and will be started as soon as a plentiful supply of coke is assured. No. 2 stack is being rebuilt with all modern improvements.

The S. R. Smythe Company, engineers and contractors, Lewis Block, Pittsburgh, Pa., have received a contract from the Lukens Iron & Steel Company, Coatesville, Pa., for the construction of two 30-ton acid open hearth steel melting furnaces, work on which has already been commenced.

The Wetherald Rolling Mill Company, Frankton, Ind., have signed the wage scale of the Amalgamated Association for the year ending June 30, 1895. The plant of this concern consists of five scrap furnaces, three heating furnaces, three trains of rolls, the product being bar iron and the annual capacity about 10,000 gross tons.

The Duquesne Steel Works, Duquesne, Pa., closed down on Saturday, the 17th inst., and will be idle for about a month, during which time a new blooming mill and engine will be installed and other improvements made.

The McCullough Iron Company, at North East, Md., are introducing oil as fuel.

The Stewart Wire Mills, at Easton, Pa., are getting ready to start up.

The Sheridan Iron Company of Sheridan, Pa., are experimenting with a magnetic concentrator on Cornwall ore.

The New Haven Rolling Mill at Fairhaven, Conn., has stopped for want of soft coal.

Joanna Furnace, a charcoal plant at Joanna, Pa., is being prepared to go into blast.

An order has been signed by Judge Wickes in Baltimore dissolving the Ashland Iron Company of Baltimore County and appointing William Gilmor Hoffman, Jr., receiver, in \$25,000, to wind up their affairs and distribute the assets. All claims must be filed before August 16. The dissolution is an entirely amicable one, having been decided upon at a recent meeting of the stockholders.

### Machinery.

The Board of Directors of the Westinghouse Machine Company of Pittsburgh have declared the regular quarterly dividend of 1½ per cent. on the preferred and common capital stock, payable on July 2 next.

At a recent meeting of the directors of the Niles Tool Works, Hamilton, Ohio, Alex. Gordon was elected president, R. C. McKinney general manager and treasurer, and Jas. K. Cullen secretary. Mr. Cullen, who has had charge of the Chicago office for a number of years, has removed to Hamilton, Ohio, and has been succeeded by G. F. Mills.

The Board of Directors of the Westinghouse Air Brake Company of Pittsburgh have declared the regular quarterly dividend of 5 per cent., payable on July 10 next.

The Robinson-Rea Mfg. Company of Pittsburgh, builders of rolls and rolling mill machinery, are making a new housing for the Lalanc-Grosjean Mfg. Company of Harrisburg, Pa.; also a pair of cold rolls, which when coupled to the present train will give a new stand of cold rolls. The same firm are building for the second named concern a pair of 30-inch tin mill rolls, it being the intention of the Lalanc-Grosjean Mfg. Company to engage in the manufacture of tin andterne plate at an early date.

J. G. Speidel of Reading, Pa., manufacturer of the Economic Safety Hoist, has formed a partnership with H. P. Roeper, late with the Harlan & Hollingsworth Company of Wilmington, Del., and will continue the manufacture of hoists, elevators, cranes, &c., at 807 and 809 Cherry street, Reading, Pa.

The Isaac D. Smead Foundry Company and the Smead Heating and Ventilating Company of Toledo, Ohio, passed into receiver's hands on the 12th inst. The liabilities are stated at \$250,000, with assets covering about half that amount.

The Gisholt Machine Company of Madison, Wis., will commence work shortly on an addition to the factory, 125 x 75 feet, with a two-story office building. A portion of the new building will be used as a photograph gallery, where every machine will be photographed. A traveling crane will run into the photograph gallery and the machines will be lowered in front of a permanent white background.

In the courts at Pittsburgh last week, a petition was presented for the dissolution of the A. French Spring Company, Limited, of that city. The old concern will be succeeded by the A. French Spring Company, a corporation.

The Reeves Pulley Company, Columbus, Ind., have just perfected, and are now introducing, a wood split pulley, ordinarily known as "the Reeves black pulley," which, in its construction and finish, is intended to meet the wants of that portion of the trade demanding a second grade, or what is commonly termed "cheap" pulley. Its design is precisely the same as "the Reeves," the difference being that all materials, excepting glue, are of second instead of select grade. The finish is the ordinary black enamel. Although they have only had it on the market about 30 days, they have already received sufficient additional orders to keep their large factory running full time

until August 1. This departure, together with their recent most successful venture in the European market, has compelled them to greatly increase their force.

The Champion Blower & Forge Company of Lancaster, Pa., are crowded with orders, and within the last year increased their capacity very largely and will make further increases in this direction in the very near future. The concern expect during this fall to increase their plant fully one-half.

The Phoenix Foundry and Machine Company of Hazelton, Pa., have secured a verdict of \$10,500 for money due from the Pittston Press Brick Company for machinery.

The New Goshen Pulley Company, Goshen, Ind., made one consignment of pulleys recently which amounted to over \$3000.

The Metropolitan Electric Company, at Reading, Pa., are putting up a new power station, and have placed the contract for the iron roof and traveling crane with the Berlin Iron Bridge Company of East Berlin, Conn.

W. H. Berry has placed an order for nine boilers of a new design with Robert Wetherill & Co. of Chester, Pa.

P. F. Burke is building a new machine shop on Dorr street, Boston.

N. M. Neal will erect a foundry at Auburn, Maine.

John W. Reynolds of Ballston Spa, N. Y., has purchased of the heirs of Arnold Harris the foundry and machine shop property known as the Harris Foundry.

The Hendrick Mfg. Company of Carbondale, Pa., have put in a new Payne compound condensing engine.

At a meeting of the directors of the Eastern Forge Company, 70 Kilby street, Boston, Mass., recently held at the office of the clerk, Ardon W. Coombs, in Portland, Maine, it was deemed necessary, on account of the long continued financial and business depression, to make an assignment for the benefit of creditors to William N. Fisher of Gloucester and George F. Morse of Portland, Maine.

J. H. & P. Lake Company of Massillon, Ohio, formerly of Hornellsville, N. Y., manufacturers of clutch pulleys, have been closed by the sheriff. Proceedings in foreclosure were instituted by W. W. Fish, trustee, of Elmira, N. Y., to secure a mortgage of \$15,000.

The Waterbury Farrel Foundry & Machine Company of Waterbury, Conn., have recently fitted up J. H. Williams & Co. of Brooklyn with their new automatic drop hammers and with trimming presses for the new shops of that concern. They have recently built a good many beadlers for making rivets and bolts automatically by cold heading, having orders from large concerns in Cleveland and Columbus, Ohio, and several orders from Germany. They also build the Goodyear reducing machine, for which S. W. Goodyear of Waterbury is sole sales agent. This machine is used by most of the large wire producers for pointing wire, and is widely employed for reducing or tapering wire and rods. Another line in which they note an increasing demand is screw threading machinery for rolling threads on screw blanks, bicycle spokes, &c.

### Hardware.

The Sandy Hook Hardware Company of Newtown, Conn., have been organized with a capital of \$10,000 for the purpose of manufacturing hardware.

C. B. Maynard, Northboro, Mass., whose tool handle factory was burned February 21 last, has erected a new building in which he will continue the manufacture of tool handles.

The Middletown, Conn., works of the Hatch Cutlery Company will soon be removed to Buchanan, Mich.

The Meriden Britannia Company, Meriden, have increased the number of their working days from four to five per week.

The wages of the employees of Fairbanks & Co., St. Johnsbury, Vt., were reduced 10 per cent. June 1. The reduction applies to all departments and branches of the business wherever located, but does not, however, affect those employees whose wages have been reduced by reason of working on short time.

The Craighead Mfg. Company will soon locate in Ansonia, Conn. The company manufacture fine brass lamps, artistic brass goods, cast brass, &c. From 50 to 75 hands will be employed.

The Poughkeepsie Rod Company, Poughkeepsie, N. Y., have been incorporated. The company will manufacture fishing rods and tackle. The capital is \$20,000. The directors of the company are H. V. Pelton, G. P. Pelton and B. G. Leeper.

The Indiana Wire Fence Company, Crawfordsville, Ind., are rapidly completing an addition to their plant.

The New Haven Safety Door Guard Company have been organized at New Haven, Conn. The company's capital is \$2000.

A new stock company capitalized at \$42,000 will begin business in Winsted, Conn., as soon as a factory can be built and equipped. The president of the company is J. L. Carson, and it will be known as the Winsted Metalliform Company. The company will manufacture upholstery hardware and other articles composed of iron and leather.

The H. W. H. Foundry Company, Racine, Wis., are now fitting up their foundry for the manufacture of the following articles: Sash weights, cast iron mauls, horse weights and cast iron washers. The patent sash weight made by this company, it is claimed, shows no seam, has center eye that is perfectly smooth, and is so constructed that the weight cannot hang any other way than plumb, and will not cut the cord or allow the knot to become untied.

At Pittsburgh last week, the Columbia Wire Company of Chicago entered suit against the Pittsburgh Wire Company, claiming \$50,000 damages, and praying for an injunction to restrain the defendant company from infringing on patents owned by the plaintiff company. The Columbia Wire Company, it is stated, own all of the barb wire patents under which substantially all barb wire is manufactured. They ask that the defendant company be restrained from using barb wire machines in violation of their patents. It is claimed that those of the patents in issue have already been sustained by the Chicago courts. A rule was issued, returnable on June 29, requiring the defendants to show cause why the injunction should not be granted. Among the licensees of the Columbia Wire Company are the Oliver & Roberts Wire Company and the Consolidated Steel & Wire Company, both of Pittsburgh.

The Anthony & Cushman Tack Company's factory at Taunton, Mass., is now running nights to fill orders received.

Stanley Tack Works, Belleville, Ill., are making arrangements to put in 30 tack machines with a view to making a full line of cut tacks, which is a new feature of their business, the plant having heretofore confined their product exclusively to small nails and D. P. tacks.

Owing to extensive repairs in their factory, Wells Bros. & Co., Greenfield, Mass., will be closed down during the first week in July. They advise us that they may be unavoidably slow in filling orders for special goods, but that regular goods will be shipped with promptness.

The United States Circuit Court for the Northern District of New York has this week granted an injunction and an accounting of damages to the Kilmer Mfg. Company of Newburgh against J. Wool Griswold of Troy, restraining him from manufacturing certain wire bale ties, on account of such manufacture being an infringement on certain patents owned by the Kilmer Mfg. Company.

A new boiler and storage house is to be added to the plant of the Stanley Rule & Level Company, New Britain, Conn. It is to be a brick building, 50 x 82 feet, with a 100-foot brick stack.

#### Miscellaneous.

The Union Malleable Iron Works, at Moline, Ill., have been purchased by C. H. Deere, and the plant is hereafter to be operated in the interests of Deere & Co. and the Deere & Mansur Company, in both of which concerns Mr. Deere is heavily interested.

The Central Cycle Company of Indianapolis have completed their new building, and, with the old building occupied since the company were organized, they have one of the most convenient and commodious plants in the West.

A. H. Childs & Co. of Pittsburgh, dealers in mill supplies of all kinds, have secured a contract for supplying the Beaver Falls Mills of the Carnegie Steel Company, Limited, at Beaver Falls, Pa., with a 44-inch three-ply leather belt 122 feet in length.

The Cambridge Roofing Company of Cambridge, Ohio, have recently made a long

needed improvement in their plant by putting into operation the very latest design of machinery for the manufacture of galvanized eave trough and conductor pipe in sections up to and including 10 feet long, and they are now in position to execute orders for this class of goods with greatest dispatch.

#### OBITUARY.

GEORGE PETERS.

George Peters, for many years manager of the Peters-Calhoun Company, Newark, N. J., manufacturer of harness and saddlery goods, died June 13, after a six weeks' illness, of valvular disease of the heart, at his home in Newark. He was born November 17, 1818, in Germantown, Pa., and at the age of 13 entered the harness making concern of his uncle, purchasing an interest in the business seven years later. He was public spirited and filled a number of positions in the municipal service at various times, having been alderman, freeholder and City Home trustee. He was also president of the Consumers' Coal Company, director in the State Banking Company, New Jersey Life Insurance Company, Yonkers Gaslight Company, and other enterprises. He was for 40 years a vestryman in Trinity Church, from which he was buried Friday, June 15. He leaves a widow and nine children.

JOSIAH J. RICHARDS.

Josiah J. Richards, manager of the Bessemer and Siemens-Martin departments at the Atlas Works, Sheffield, died last month in England. Mr. Richards began his business career in the Ebbw Vale Steel Works, of which he was for some years the manager. In 1877 he accepted the appointment which he held at the time of his death. In all the varied developments of modern steel manufacture Mr. Richards took a leading and successful part. He was one of the original members of the British Iron and Steel Institute, of which his brother, E. Windsor Richards, is now the president.

JESSE JONES.

Jesse Jones, a member of the firm of Jesse Jones & Co. of Philadelphia, one of the largest paper box manufacturers in the country, died suddenly at the Broadway Central Hotel, in New York, on June 15. Mr. Jones had been on a business trip through the New England States and had reached New York on his way home. The cause of death was heart disease. He was ill but three hours.

Mr. Jones was a native of this city and was about 41 years old. He was a self made man. Twenty years ago he started in the business of manufacturing paper boxes, on Sixth street, above Commerce, with Charles F. Stone, who is still a member of the firm. The present establishments are at 615 and 617 Commerce street and Twelfth and Noble streets. Four years ago the capacity of the Commerce street factory was doubled.

WILLIAM H. CROSSMAN.

William H. Crossman of W. H. Crossman & Brother, export and import merchants, 77-79 Broad street, New York, died June 19, at his home, 29 East Sixty-fifth street, New York. The funeral will be from his late residence, Thursday, June 21. Interment at Greenwood. The firm of W. H. Crossman & Brother were founded more than 30 years ago, buying hardware largely for Hooker &

Co. and Huntington, Hopkins & Co., San Francisco, A. Baldwin & Co., New Orleans, and several other concerns in this country. In the seventies they began to export manufactured goods and import staples, until they did a business with a great many of the leading ports of the world, though chiefly with South America, Hawaiian Islands, South Africa and Australasia, in many instances chartering their own vessels both ways.

#### Wire Ropes.

At a recent meeting of the Yorkshire College Engineering Society, in England, Herbert Cheesman of the Hartlepool Ropery Company, Hartlepool, England, read a paper on "Wire Ropes," of which the following is an abstract. After describing the general construction of wire ropes, the lecturer urged the necessity of using wire having the same modulus of elasticity throughout one rope. The object of all rope manufacturers is to obtain an ultimate strength for the whole rope equal to the sum of the strength of the separate wires, and the only way of attaining this result is to use material of precisely similar elastic properties. Another very important point brought forward was the initial torsion given to each wire in the formation of the strands by the "sun and planet" mechanism. This system of preparing the strands is very generally supposed to prevent any twist being given to the separate wires, but it was clearly demonstrated that a slight axial rotation of each wire is necessary to entirely prevent any torsional stress being put upon them. Mr. Cheesman has now brought out a machine which enables the operators to adjust this axial movement to the requirements of the lay of the strand. In speaking of the rotation of wire ropes, Mr. Cheesman pointed out that all long ropes not of a perfectly cylindrical form must necessarily rotate, though they may be fixed at both ends, for they always tend to follow the path of the greatest bearing, which is down the spiral of the rope. This tendency increases with the weight lifted, and he had observed that by raising a kibble empty it made five revolutions, while with the weight of two men it made 11, and when filled with earth 19. The rotation of the rope is advantageous in equalizing the wear. Illustrating the advantages of internal lubrication, Mr. Cheesman quoted the experiments of A. S. Biggart. An unlubricated rope stood 16,000 bends before fracture commenced, while the same rope when lubricated stood 38,000 bends over the same pulley. Another similar test showed that the life of the rope was just doubled by internal lubrication.

A peculiar feature of the transatlantic passenger traffic at the present time is that the larger tide of steerage travel is flowing eastward rather than westward, as is generally the case at this season. Outgoing steamers from New York are sailing with crowded steerages, while immigration is not up to the average. This is attributed to the existing business depression and comparative scarcity of employment in this country.

W. A. Stanton, secretary and treasurer of the Fayette Manufacturing Company, manufacturers of silica brick and magnesia, sailed on the "Campania" last week. He goes to the Continent to transact some business there.



## The Iron and Metal Trades.

The partial resumption of work has given a number of mills an opportunity to resume work and the supply is therefore more liberal. Still the quantity of raw material available for Soft Steel is yet very limited and will remain so until the Coke strike is finally settled. The leading Connellsville interest has advised some customers that they could count upon a regular supply from now on, but the fact remains that on Saturday last less than 4000 ovens out of about 17,500 ovens were running. Nor is it quite certain whether scenes of violence will not precede the final collapse.

In any event it will take some time before the Western Steel trade will again be swinging along in its accustomed style. It looks, too, as though at least one large Pittsburgh union mill will break away from the Amalgamated Association.

Yet with all these doubts as to the early resumption of full work buyers are not taking hold. There is still some demand for spot stock, but so far as Soft Steel is concerned buyers will simply not pay the prices asked.

It is argued that the advance in costs promises to be only small. Furnacemen insist that they do not expect to pay more than \$1 to \$1.10 for Coke on new contracts. While at least one round block of Bessemer Pig has been sold in the valley at \$10.90, the majority of buyers regard that figure as much too high. It is true, however, that little Pig is offering even at \$11, for future delivery, from the valleys.

In Soft Steel the market has weakened so far as the moderate transactions closed reveal the situation. There are indications that \$17, Pittsburgh, or its equivalent has been shaded.

At the root of all hesitation and of the growing feeling that prices may soon develop a downward tendency lies the fact that the demand for all kinds of material continues very light. Reduced stocks have little effect in the face of the knowledge that the productive capacity which is preparing to resume work is more than able to cover requirements, and that the chance is that low prices will be again accepted, if past experience is of any value as furnishing any indication concerning the temper of sellers.

It is urged that the general business situation must improve and that the railroads must become much livelier buyers than they now are before a steady healthy upward movement can maintain itself.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, June 20, 1894.

**Pig Iron.**—Business in local Coke Iron has kept up very well. This is the third week of the active buying movement, and yet the circle of buyers seems to be widening. Quite a disposition has been manifested to contract for deliveries beyond this year, but furnace companies are decidedly unwilling to take chances so far ahead at anything like present prices. A peculiar feature of the market at present is that when a consumer finds that he cannot buy at a lower rate than was made on his last contract, he quickly makes up his mind to purchase a larger quantity than he had originally intended. Inquiries are increasing for Southern Coke Iron, but sales are not much more numerous than last week. Buyers would perhaps take hold for deliveries through the remainder of the year if the furnace companies would take the risk of advances in freights, which they are unwilling to do. Soft grades of Southern Coke are still very scarce, and are offered for sale only in carload lots. Lake Superior Charcoal has been quiet. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$15.00 @	\$15.50
Local Coke Foundry, No. 1....	11.25 @	11.50
Local Coke Foundry, No. 2....	10.50 @	11.00
Local Coke Foundry, No. 3....	10.00 @	10.50
Local Scotch.....	11.50 @	11.75
Ohio Strong Softeners No. 1....	13.00 @	13.50
Southern Silvery, No. 1.....	..... @	.....
Southern Silvery, No. 2.....	..... @	.....
Southern Coke, No. 2.....	10.00 @	10.35
Southern Coke, No. 3.....	9.75 @	10.00
Southern, No. 1, Soft.....	10.25 @	10.50
Southern, No. 2, Soft.....	10.00 @	10.25
Tennessee Charcoal, No. 1....	..... @	.....
Tennessee Charcoal, No. 2....	..... @	.....
Alabama Car Wheel.....	17.50 @	18.00
Jackson County Silvery.....	15.00 @	16.00
Coke Bessemer.....	12.00 @	.....
Other Ohio Silvery.....	14.00 @	14.50

**Bars.**—The demand for Bar Iron has been fair with some improvement noted in the tone of the market. Prices appear to be considerably firmer and sales are made with less haggling over rates. Quotations continue at 1 1/2¢ @ 1.05¢, Chicago, for mill shipments. Soft Steel Bars are in somewhat less request than Bar Iron, but this is stated to be largely due to the high prices now asked on account of the dearth of Billets. Prices on mill shipments range from 1 30¢ to 1.35¢, Chicago. Jobbers quote small lots at 1.30¢ upward for Bar Iron and 1.50¢ upward for Soft Steel Bars.

**Structural Material.**—Bids were recently opened for a number of bridges to be built for the Chicago, Peoria & St. Louis Railroad, which will absorb quite a large tonnage of Iron and Steel. A number of other contracts are in the market, and the outlook for bridge work thus appears to be growing better. The demand for material for buildings is still confined to small lots. Quotations on mill shipments, Chicago delivery, are as follows: Beams and Channels, 1.50¢; Tees, 1.65¢; Angles, 1.45¢; Universal Plates, 1.45¢. Small lots from stock sell at 1.80¢ @ 1.90¢ for Beams, 1.50¢ @ 1.60¢ for Angles, and 1.70¢ @ 1.80¢ for Tees.

**Plates.**—Considerable difficulty is experienced in getting material from the mills, as so many are closed. Quite a demand for Plates is now coming from bridge builders, who are bidding on all kinds of work outside of their regular field. Jobbers report a continuance of the excellent trade from stock. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.45¢ @ 1.50¢;

Flange Steel, 1.65¢ @ 2.10¢; Fire Box, 2.50¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.80¢ @ 1.90¢; Tank Steel, 1.65¢ @ 1.85¢; Flange Steel, 2.10¢ @ 2.35¢; Boiler Tubes, in carloads, 75 % off.

**Sheets.**—Considerable business has been done in Black Sheets. Large contracts have been taken for roofing purposes. A very good inquiry is reported for Galvanized Sheets, but manufacturers are not disposed to quote for extended deliveries. Mill shipments are quoted as follows, Chicago delivery: No. 27, Common Black Sheet Iron, 2.35¢ @ 2.40¢; Steel Sheets, 2.45¢ @ 2.50¢; Galvanized Sheets, 75 and 10 % off; Sheet Copper, 14¢ to large buyers.

**Merchant Steel.**—New business continues light. The demand for Tool Steel has latterly been quite small owing to the slackness of work in machine shops and other consuming establishments. We quote mill shipments, Chicago delivery: Smooth Finished Machinery and Tire, 1.70¢ @ 1.80¢; Open Hearth Spring Steel, 1.85¢ @ 1.90¢; Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.45¢ @ 1.50¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

**Billets and Rods.**—The inquiry for Billets has been large, but conditions imposed with regard to deliveries have been such that manufacturers have not been willing to close contracts on the terms required, and therefore actual business is light. Quotations are repeated at \$18.25 @ \$18.50. The same remarks apply to Wire Rods, on which the quotation of \$25 is repeated for July and August delivery.

**Rails and Track Supplies.**—The Steel Rail tonnage entered from day to day at this time is about equal to the work turned out, so that prospects continue excellent for a good run of the local mill. Large orders, however, are scarce and the tonnage is made up of an accumulation of small ones. Standard Rails are quoted at \$25 @ \$27; Steel Splice Bars, 1.35¢ @ 1.40¢; Track Bolts with Hexagon Nuts, 2.10¢ @ 2.15¢; Spikes, 1.75¢ @ 1.80¢; Links and Pins, 1.65¢ @ 1.70¢.

**Old Rails and Car Wheels.**—Some speculation appears to be developing in Old Iron Rails, and they are being absorbed by dealers whenever prices are favorable. Quotations are nominal at \$10, Chicago. Old Steel Rails are selling at \$6.50 @ \$9.50, according to length and selection. Old Car Wheels appear to have been pretty well picked up by speculative buyers and are now scarce, but nominal rates still continue at \$10 @ \$10.50.

**Serap.**—Business continues extremely quiet and only small lots are changing hands. Dealers quote the following selling prices @ net ton: Railroad Forge, \$9; Dealers' Forge, \$8 @ \$8.50; No. 1 Mill, \$6.50; Pipes and Flues, \$6; Heavy Cast, \$7 @ \$7.50; Stove Plate, \$5 @ \$5.50; Fish Plates, \$10; Horseshoes, \$9; Mixed Steel, gross ton, \$5.50.

A majority of the striking soft coal miners and coke workers in Pennsylvania and Ohio are reported as returning to work, and the trouble in those regions is regarded as being practically over. The Alabama miners still hold out and have been engaged in destroying property. Nevertheless the back of the strike appears to be broken, and a general resumption is merely a question of time.

## Philadelphia.

Office of *The Iron Age*, 230 South Fourth St.,  
PHILADELPHIA, Pa., June 19, 1894.

The practical settlement of the Coal strike ought to brighten things up a little, but as yet there are no indications of any more demand than there was a week ago. Possibly it may be that the near approach of the midsummer holidays deters consumers from entering upon new engagements, or it may be that they are waiting for sellers to show their hands, but whatever the cause, it is certain that business is about as scarce as ever. There is a better feeling in regard to prices, however, and the reaction in Billets and Finished Material is not expected to be anything like what was supposed it might be three or four weeks ago. Indeed, it is a question if there will be any reaction worth naming, stocks being so completely exhausted that it will take a long time to catch up. Even then the cost of production will be so much higher that a break in prices is not among the strong probabilities. Foundry Pig Metal has been so flat during all the excitement in Steel that it ought to have its turn for an advance—providing there is any market at all, and there are already some indications that such will be the case. Stocks have decreased in a most extraordinary way (250,000 tons during May), while the current output is also 15,000 tons per week less than it was during April, so that the conditions are unusually favorable for Pig Metal, to say nothing of the higher freights from the West and South. It has been a remarkable year, however, and while there must be a big change soon, there is nothing in sight to-day that warrants predictions of any decided movement in the immediate future.

**Pig Iron.**—At the inside rates recently quoted liberal sales could be made, but buyers are reluctant to pay an advance, and, with very few exceptions, have got what they wanted at the old prices, or are still waiting until some one feels inclined to take their bids. The situation is not favorable, however, for those who are waiting for reactions, because, as already shown, the chances are very much in the opposite direction and some brands are already commanding a little more money. There is less No. 2 X selling at \$11.25 than there was some time ago, and there is more selling at \$11.75, showing that the tendency is toward better figures, not in all cases perhaps, but whatever changes have been made are in that direction. The same may be said of No. 1 X, but not so distinctly in the lower grades, as buyers still hold to \$10.25 @ \$10.50, and while the supply of these grades is smaller than it was some time ago, buyers have not yet been compelled to exceed \$10.50, unless for extra quality or some special reason for the extra figure. The great drawback to the situation is the exceedingly light demand, and while there may not be much improvement inside the next 60 days, all the conditions favor an advance as the ultimate outcome. General quotations may be given as follows for Philadelphia and equivalent points, with 20¢ @ 30¢ less for deliveries at Harrisburg, York, Baltimore, &c.:

Bessemer	\$13.00 @ \$13.50
Standard No. 1 Foundry X	12.50 @ 13.00
Standard No. 2 Foundry X	11.50 @ 12.00
No. 2 Plain	10.75 @ 11.00
No. 1 Soft	10.50 @ 10.75
No. 2 Soft	10.25 @ 10.50
Standard Gray Forge	10.50 @ 10.75
Ordinary	10.25 @ 10.50

**Steel Billets.**—There is no business to report in this vicinity, although there is some inquiry with a view of finding out what the true inwardness of the situation is. The majority of consumers have Billets due them on old contracts, and they are more anxious to secure deliveries of these than to make new engagements. Quotations, however, range from \$19.75 to \$20.25, but on the right kind of bids there is little doubt that business could be done at \$19.50, although those who are compelled to buy for July may have to pay \$20 or a little over, but all depends on the character of the order.

**Finished Material.**—The demand up to this time has been equal to the fullest capacity of the mills to supply, owing to so many being shut down for want of fuel. As this will probably cease to be a factor in course of the next couple of weeks a larger supply is confidently expected, and with that possibly somewhat lower prices, although they are none too high now when the increasing cost is taken into consideration. Nevertheless, every one knows that 10¢ or 15¢ of the advance has been due to the enforced restriction of output rather than to any increased demand, which, as a matter of fact, is no larger than it has been for several weeks past. Regarding the future there is nothing particularly bright in the outlook, although it may be that business has been held in abeyance, knowing that in any event it could not be placed to advantage while the strike was on. Stocks are undoubtedly at the lowest point possible, and that a good miscellaneous demand will continue for some time to come goes without saying. Prices, of course, will depend upon how many mills are ready to compete for work and to what extent they will be able to handle it, but the general impression is that there will be a slight reaction in Plates and Shapes, as they have advanced more than anything else. Skelp is likely to be wanted in good sized lots, however, and for some time to come there will probably be a fair supply of orders for all the various specialties at quotations about as follows, delivered:

Grooved Skelp	1.25¢ @ 1.30¢
Standard Refined Bars	1.30¢ @ 1.40¢
Medium quality	1.20¢ @ 1.25¢
Tank Steel	1.35¢ @ 1.45¢
Heavy Plates	1.30¢ @ 1.40¢
Shell	1.50¢ @ 1.60¢
Flange	1.60¢ @ 1.80¢
Angles	1.40¢ @ 1.50¢
Beams and Channels	1.50¢ @ 1.60¢

**Old Material.**—There is a demand for Old Steel Rails at about \$9.50 delivered and Iron at \$11.25 @ \$11.50, but the general market is dull, as mills are doing very little, and are likely to do little until after the midsummer holidays. General quotations are about as follows, delivered:

Heavy Melting Steel	\$9.50 @ \$10.00
Light Melting Steel	7.50 @ 8.00
No. 1 Wrought Scrap	10.50 @ 11.00
Machinery Cast	9.50 @ 10.00
Wrought Turnings	8.00 @ 8.50
Cast Borings	6.00 @ 6.50
Old Iron Rails	11.50 @ 12.00

The heirs to the estate of Howard W. Middleton, late of 945 Ridge avenue, Philadelphia, Iron and Steel merchant, have formed themselves into a stock company and will continue the business at the same address under the style of the Howard W. Middleton Company. Frank Merrihew is president and Hy. Tatnall secretary and treasurer.

## Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building,  
PITTSBURGH, June 20, 1894.

A partial resumption of work among the Coal miners has taken place in certain sections, but the shipments so far have been very light and have been made mainly to railroads whose wants must first be satisfied before the mills can expect to get fuel in sufficient quantities to warrant starting up. The situation in the Iron and Steel trades shows no material change, the limited sales being principally for small lots. A few inquiries are in the market for material for the last half of the year, but ideas of buyers and sellers are far apart and little or nothing is being done. While none of the finishing mills are crowded with orders, prices for Finished Material are firm and prompt deliveries are hard to obtain. An order for some 2000 tons of Shapes placed last week was split up among four concerns in order to facilitate prompt deliveries. All signs point to an early collapse of the Coke strike within a few days, there being much dissatisfaction between the strikers and their leaders. The Hoop mill scale has been satisfactorily adjusted between the Amalgamated Association and the two concerns in this district that continue to recognize that organization. Indications point to a conflict between the one large Steel concern here that has heretofore signed the scale and the Amalgamated Association, and it is not improbable that the mill will be non-union after their present scale expires on the last day of this month.

**Pig Iron.**—Very little is doing, nearly all the furnaces in the Pittsburgh and Valley districts being idle for want of Coke and not caring to enter sales until they have started and know pretty definitely what Coke will cost for the last half of the year. Indications point to a very large production of Bessemer Iron when the furnaces get started. Some stacks that have heretofore run on Foundry or Mill Iron will resume on Bessemer, while in the Shenango Valley two furnaces that have been idle more or less for the past year have been leased by Cleveland parties and will be started on Bessemer as soon as a supply of Coke can be had. The demand for Forge Iron is very light, the few sales taking place being for small lots only. The same is true of Foundry Iron, but prices on both kinds are firm, a sale of Mill Iron having been made last week on the basis of \$9.35 at Valley furnace, equal to \$10 at Pittsburgh. For delivery during the next two or three months we quote as follows:

Neutral Gray Forge	\$10.00 @ \$10.15, cash.
All-Ore Mill	9.75 @ 10.00 "
No. 1 Foundry	11.50 @ 11.75 "
No. 2 Foundry	10.75 @ 11.00 "
Bessemer	11.50 @ 11.75 "

We note a sale of 3000 tons of Bessemer at \$10.90 at Valley furnace, equal to \$11.55 Pittsburgh, equal deliveries in July, August and September. Also a sale of 200 tons of Gray Forge for prompt delivery at \$9.85 at Valley furnace, or \$10 Pittsburgh.

**Billets.**—The Duquesne mill has closed for repairs and improvements and will be idle about a month. Jones & Laughlins, Limited, have heretofore signed the Amalgamated Association scale, but unless granted concessions sufficient to put them on an equitable basis with competitors running non-union, will refuse to sign a wage scale



for the year beginning July 1, and if necessary will break away from the Amalgamated Association. A few inquiries for Steel for forward delivery are in the market, but prices quoted have not been satisfactory to buyers and negotiations have been dropped for the time being. Two sales of 1500 tons each for July, August and September delivery are reported, one at \$17.50 and the other at \$17.70, at maker's mill.

**Ferromanganese.**—We note a sale of 25 tons of domestic at \$53, delivered.

**Structural Material.**—A bridge concern let a contract last week for about 2000 tons of material, Pittsburgh taking about 1200 tons and Eastern mills the balance. The prices realized were about \$3 per ton higher than the lowest prices ruling some time since, the Beams and Channels being based on 1.25¢ and the Angles and Plates 1.20¢, Pittsburgh. In order to secure prompt deliveries it was necessary to split the order among four concerns, some mills being still idle and others unable to promise prompt deliveries except for part of the business. We quote as follows: Beams and Channels up to 15 inches, 1.25¢ @ 1.35¢, according to order; Angles and Universal Plates, 1.20¢ @ 1.25¢; Tees, 1.35¢ @ 1.40¢.

**Plates.**—The volume of business is fair, the concerns in operation being able to secure outside prices when prompt shipments are guaranteed. We quote as follows: Tank, 1.25¢ @ 1.30¢; Flange, 1.45¢ @ 1.60¢, according to order; Shell, 1.40¢ @ 1.50¢; Marine, 1.60¢ @ 1.70¢; Fire Box, 2¢ @ 4¢, according to quality.

**Muck Bars.**—We note two sales aggregating 250 tons at \$20, delivered at buyer's mill. The demand is very light.

**Bars.**—There is a fair amount of business for early shipment, but buyers are not willing to contract for future supplies, in the belief that prices will recede to some extent when the mills get in operation again. We quote Iron Bars at 1.05¢ @ 1.10¢ in carload lots, and Steel Bars at 1.15¢, with the usual extras.

**Merchant Steel.**—There is only a moderate demand, with prices showing a weaker tendency. We revise quotations as follows: Bessemer Machinery, 1.35¢; Open Hearth Machinery, 1.50¢ @ 1.60¢; Open Hearth Spring, 1.70¢ @ 1.75¢; Cold Drawn Steel Shafting, 2.40¢, base; Tire Steel, 1.60¢ @ 1.65¢; Tool Steel, 5¢ @ 7¢ for ordinary grades; extra grades, 11¢ @ 13¢.

**Sheets.**—Conditions as reported last week are unchanged. We quote as follows: No. 24, 2.15¢; No. 26, 2.25¢, and No. 27, 2.35¢. For Steel about \$2 ¢ ton advance is asked.

**Wire Nails.**—The demand is only fair, with prices unchanged on the basis of \$1.10, Pittsburgh, in carload lots for the usual averages. The Executive Committee of the Wire Nail Association is in session in this city to-day. The demand for Cut Nails is moderate, and we quote at 95¢ in carload lots for the usual averages.

**Wire Rods.**—No transactions are reported during the week.

**Barb Wire.**—The market is very quiet, with no new features prevailing. We continue to quote at \$2.10, Pittsburgh, for Four-Point Galvanized in carload lots. We quote Plain Wire at \$1.40 @ \$1.45 in carload lots.

**Skelp Iron and Steel.**—Several inquiries for good sized lots are in the

market. None of the mills have well assorted stocks and it is extremely difficult to get prompt shipments of certain sizes. Prices are unchanged but firm and we repeat previous quotations as follows: Grooved Steel Skelp, 1.15¢ @ 1.20¢; Sheared Steel Skelp, 1.25¢ @ 1.30¢; Grooved Iron Skelp, 1.25¢ @ 1.35¢; Sheared Iron Skelp, 1.40¢ @ 1.45¢.

**Pipes and Tubes.**—An inquiry for 7½ miles of Line Pipe is in the market. General conditions are unchanged, makers continuing to get higher prices for such material as may be in stock. The demand is only moderate.

**Connellsville Coke.**—The situation in the Connellsville region shows that the strikers are losing ground rapidly and the desire of the old workmen to return to work is becoming more apparent. At this time about one fourth of the entire number of ovens in the region are in blast, and each day sees additional ovens active over the preceding day. The McClure Coke Company and the H. C. Frick Coke Company are daily sending new men into the region, and it is the opinion of those best informed that the end is not far off. For the week ending Saturday, June 9, there were 3855 ovens active in the region and 13,630 idle, with a total estimated production for the week of 39,882 tons. Compared with the production of the previous week this was an increase of 3017 tons. In the active list of ovens there was a net increase of 328 ovens. As high as \$3 ¢ ton is being paid for Furnace Coke, while Foundry Coke has sold up to \$4 ¢ ton.

The Juniata Iron & Steel Works of Shoenberger & Co., Pittsburgh, Pa., which have been closed down for several weeks on account of the Coal strike, have resumed operations in several departments, and it is expected that the entire plant will be in full operation within a few days.

## St. Louis.

(By Telegraph.)

Office of *The Iron Age*,  
Bank of Commerce Building,  
St. Louis, June 20, 1894.

**Pig Iron.**—The conditions prevailing in this market do not indicate any changes. There is only a fair demand and prices are unchanged. Consumption grows less daily, and as the season for shutting down for annual repairs is close at hand, any immediate improvement in the demand is hardly possible. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$11.00 @ \$11.25
Southern Coke, No. 2 Foundry.....	10.00 @ 10.25
Southern Coke, No. 3 Foundry.....	9.75 @ 10.00
Southern Car Wheel.....	17.00 @ 18.00
Lake Superior Car Wheel..	16.25 @ 16.50
Ohio Softeners.....	14.25 @ 14.50

**Bar Iron.**—Mills report an improvement in the demand, which, however, is not yet sufficiently heavy to advance prices, which are quoted at 1.15¢ for lots from mill. Jobbers continue to quote 1.30¢ @ 1.35¢.

**Barb Wire.**—The course of the Barb Wire market seems to indicate that the reported combination referred to under this head some few weeks ago is now an accomplished fact. Mills quote \$1.90 for Painted and \$2.30 for Galvanized, which prices are being firmly adhered to. Jobbers' prices are \$2 @

\$2.05 for Painted, with the usual advance for Galvanized.

**Wire Nails.**—There is a gradual curtailment of production, which helps to hold the market firm at \$1.20 for carload lots from mill. Trade is not heavy, but is sufficiently brisk to enable mills to ship their output pretty nearly as fast as it is turned out. Mills are only working half time and in some cases are closed down entirely.

**Rails and Track Supplies.**—The movement in Old Iron Rails is confined to occasional sales of carload quantities at \$10, f.o.b. cars St. Louis. Steel Rails are dull at \$26.50 @ \$27. Track Supplies are ordered in limited quantities for immediate use. We quote as follows: Steel Rails, \$26.50 @ \$27; Splice Bars, 1.35¢; Spikes, 1.75¢; Bolts, Square Nuts, 2¢; with Hexagon Nuts, 2.10¢; Steel Links and Pins, 1.65¢; Iron, 1.75¢.

**Pig Lead.**—This metal has shown considerable strength since our last report, and several hundred tons have changed hands at from 3.05¢ to 3.15¢. The latter price is asked to-day, with bids of 3.12½¢, without, however, accomplishing any business.

**Spelter.**—At 3.20¢ this metal seems stationary. There is a steady demand, but not of sufficient magnitude to influence the price. There is not much surplus stock on hand, and an early improvement in price is expected. Offerings at 3.20¢ are quickly absorbed, so that the market is firm at that figure.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,  
CINCINNATI, June 20, 1894.

There has been an irregular and unsettled market for Pig Iron during the week. Many of the Southern Iron furnaces have had no Iron to sell and others have been able to obtain an advance of 25¢ @ 50¢ ¢ ton in a small way, prices being made according to the urgency of the demand, so that there are no regular rates quotable. The advance in freight rates north of the Ohio River and thence eastward has been postponed until July 1, but there was considerable purchasing before June 15 in anticipation of such an advance on that date. We advance quotations 25¢ ¢ ton on Gray Forge, not because there has been regular advance, but because at least this advance is obtainable, and on Soft Iron still higher prices could doubtless be obtained. Charcoal Iron is selling to a moderate extent at previous prices. Of course there are no large lots of Southern Foundry Iron selling, but the offerings are so light that the furnaces find it difficult to fill their contracts. Stocks in the South have been largely reduced since June 1, but it is thought that with the Coal strike settled there will soon be an adequate supply of Iron produced. Quotations are as follows:

<b>Foundry.</b>	
Southern Coke, No. 1.....	\$10.25 @ \$10.50
Southern Coke, No. 2.....	9.25 @ 9.50
Southern Coke, No. 3.....	9.00 @ 9.25
Ohio Soft Stone Coal, No. 1.....	14.50 @ 15.50
Ohio Soft Stone Coal, No. 2.....	14.00 @ 14.50
Lake Superior Coke, No. 1.....	12.50 @ 13.00
Lake Superior Coke, No. 2.....	11.50 @ 12.00
Hanging Rock Charcoal, No. 1.....	17.00 @ 17.50
Hanging Rock Charcoal, No. 2.....	16.50 @ 17.00
Tennessee Charcoal, No. 1.....	13.00 @ 13.50
Tennessee Charcoal, No. 2.....	12.00 @ 12.50

<b>Car Wheel and Malleable Irons.</b>	
Standard Southern Car Wheel	16.25 @ 17.00
Lake Superior Car Wheel and Malleable.....	16.25 @ 16.75

<b>Forge.</b>	
Gray Forge.....	8.75 @ 9.00
Mottled Coke.....	8.50 @ 8.75

## Metal Market.

**Pig Tin.**—Speculative sales have been recorded at 19.65¢ for November delivery and at 19.65¢ for delivery at seller's option during the balance of the year. Only 50 tons were involved, but in view of the dullness of speculation and the extremely conservative policy of jobbers and large consumers the prices are at least somewhat suggestive, since November delivery is supposed to be at a considerable premium over current month, while 19.60¢ @ 19.65¢ named as close figures for the latter. Outside of speculative circles nothing has been done that would excite attention. The buying, in fact, has been extremely conservative, and to most accounts at prices very near to the quotations made by speculative operators. In other words, small parcels were dealt out at about 19.75¢ @ 19.80¢, 30 days' time, and buyers of round lots were quietly accommodated at 19.60¢, net cash, or thereabout. On the exchange sales were recorded Wednesday of 5 tons at 19.57½¢ for July and 5 tons at 19.65¢ for August delivery.

**Copper.**—Numerous bids of 9¢ for Lake Superior Ingot have been made during the past few days, and little business resulted, although selling prices of as low as 9.05¢ for autumn delivery were recorded on the Metal Exchange. The narrow difference in these prices is somewhat suggestive, but business latterly has been so narrow that true market value, except as it may be reflected in the above epitome, is extremely difficult to arrive at. The position in the market for the cheaper varieties of Copper is somewhat similar, and while 8½¢ @ 9¢ for Electrolytic and 8¼¢ @ 8½¢ stand as the popular quotations, there is some doubt about ease in buying at the inside figures. The consumption, according to most accounts, is fairly liberal in this country and in Europe and stimulated in some degree by the unusually low prices that have prevailed of late.

**Pig Lead.**—A fairly large business has been effected in a quiet way. Probably 800 tons were placed by local firms and considerable was done in the West. This served to carry prices up to 3.35¢ @ 3.37½¢ here for carload and larger lots, and at the present time offerings at less than 3.40¢ are strictly the exception outside of a limited speculative circle. It is stated that washouts at producing points have checked the output more or less, that smelters are well sold up and that speculative holdings have been reduced to comparatively small proportions.

**Spelter.**—No change has taken place except perhaps that the better tone which developed last week has made some headway. That is to say, the offering is more reserved and it is more difficult to buy at prices that were commonly quoted early in the month. For ordinary Western brands 3.50¢ upward is now generally asked.

**Antimony.**—The market has been quiet and prices have shown very little change. The range is about 10¢ @ 10½¢ for Cookson's, 8½¢ @ 8¾¢ for Hallett's, and 9½¢ @ 9¾¢ for LX on the spot.

**Nickel.**—The popular quotations are 45¢ @ 50¢ for fair sized lots.

**Tin Plate.**—There has been little change at intervals; spot orders were very fair and occasionally something like live interest was manifested in forward shipments. Hardly average busi-

ness for the season resulted, however, and prices have undergone very little change. Spot quotations are as follows: Charcoal: Melyn grade, IC, \$6.25; do., Melyn grade, Crosses, \$7.75; do., Allaway grade, IC, \$5.40; do., Allaway grade, Crosses, \$6.45; do., Grange grade, IC, \$5.50; do., Grange grade, Crosses, \$6.60; do., Terne, M.F., 14 x 20, \$7.25; do., M.F., 20 x 28, \$14.50; do., Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11; Alyn grade, 14 x 20, \$5.20; do., 20 x 28, \$10 @ \$10.25; D. R. D. grade, 14 x 20, \$4.90; do., 20 x 28, \$9.70. IC Coke: Penlan grade, \$5; do., J. B. grade, 14 x 20, full weight, \$5.15; do., 100 lb \$4.75; do., 95 lb, \$4.62½; do., 90 lb, \$4.55. IC Bessemer Steel, Coke finish: 14 x 20, full weight, \$5.15; do., 100 lb, \$4.70 @ \$4.75; do., 95 lb, \$4.60; do., 90 lb, \$4.50. IC Bessemer Steel, Coke finish, sq., \$5.35. IC Siemens Steel, Coke finish, sq., \$5.45. Wasters: S. T. P. grade, 14 x 20, \$4.60; do., S. T. P. grade, 20 x 28, \$9; do., Albearne grade, 14 x 20, \$9.

The monthly production of Copper in the United States has been as follows, according to John Stanton, the first column giving the aggregate returns from the reporting mines, which include the principal Lake, Montana and Arizona producers; the second being the metal from pyrites and from a number of smaller outside sources, being estimated:

	American Product, Reporting Gross tons.	Outside sources. Gross tons.	Total. Gross tons.
Second half 1892.....	59,239	6,287	65,526
First half 1893.....	62,470	6,478	68,938
Second half 1893.....	67,290	6,252	73,542
Totals 1893 ..	129,760	12,730	142,490
1894.			
January.....	10,832	1,340	12,172
February.....	10,245	1,340	11,585
March.....	13,759	1,340	15,099
April.....	12,475	1,340	13,815
May.....	12,668	1,340	14,008

The product of the foreign reporting mines and the United States exports was as follows:

	Foreign reporting Gross tons.	United States exports. Gross tons.
Second half 1892.....	39,655	17,980
First half 1893.....	41,048	20,361
Second half 1893.....	40,647	60,031
Totals 1893 .....	81,495	80,392
1894.		
January .....	8,145	7,717
February.....	7,217	5,590
March.....	6,922	7,137
April.....	7,385	6,209
May.....	8,013	6,140

## Financial.

The financial situation exhibits little change from that outlined last week. Business continues in a condition of extreme quietude, and the feeling in mercantile and industrial circles remains one of suspense. The virtual settlement of the coal strike, although a cause for encouragement as removing one of the most influential barriers to industrial activity, has had, so far, but little immediate effect either on trade or the stock market. This disorganizing influence out of the way, however, there is color for the expectation entertained by many business men that general trade should from now on exhibit a certain, though probably a slow, recovery. Western advices speak of business improvement as being already an accomplished fact in that section of the

country; but in the East the tokens of revived activity are still few and far between. Uncertainty in regard to the tariff bill is probably the most potent influence now operating to keep back business. Many well informed persons are confident that the measure will be expeditiously treated so soon as it is out of the hands of the Senate, and announce that the tariff leaders of the House of Representatives have agreed that there shall be no more unnecessary delay in debating its schedules. Others, equally well posted, declare that the bill cannot be finally passed in the present session of Congress. It is this divergence of opinions which operates to unsettle men's minds and causes the stagnation in business that now exists. Suspense and inactivity rule in consequence, and the demand for products has fallen into the lowest depths of slackness.

The baneful effect of the coal strike is, of course, very evident in the returns of railroad earnings, which exhibit a marked decrease in each week since the beginning of the fuel troubles, which is very suggestive. The *Financial Chronicle's* tables show that the loss for the fourth week of April was 16.16 per cent.; for May, that is, for the next four weeks, the loss was respectively, beginning with the first week, in the order given, 16.24 per cent., 18.10 per cent., 19.47 per cent., 17.66 per cent. For the first week of June a loss of 21.98 per cent. is shown, while the second week of this month is fully up to that proportion. The traffic returns of the railroads for May make the worst showing on record, which is natural in view of the manifold trials the roads have had to endure in the way of floods, strikes, cut rates, and the general business prostration. The movement of wheat, too, owing to the low price of the cereal, was only about one-half of that of a year ago, causing a serious falling off in returns. The decrease in bank clearings for all cities during last week does not, however, reflect the depression to quite so great an extent. They are given as 21.3 per cent. from 1893. The previous week showed the same proportion, while in the week before that the decrease was 23.4 per cent. Eastbound freight from Chicago last week aggregated 45,861 tons, against 53,865 tons in the previous week, and 59,670 tons for the corresponding week of last year.

The gold export movement, which decreased in proportions last week, only \$2,250,000 being sent out up to Saturday, has revived in the current week. On Tuesday \$2,000,000 were shipped, and \$2,250,000 more were engaged on Wednesday, with the prospect of further amounts being required before the end of the week. A portion of the money was, for the first time, supplied by the banks, but the drain on the Treasury had on Tuesday reduced the Government gold reserve to about \$67,000,000. This steady shrinkage in the Treasury gold reserve is receiving considerable attention in financial circles. On Tuesday the presidents of the leading New York banks met in conference to consider the matter, and although no concerted action was agreed upon, it was intimated that the banks will hereafter furnish their clients with gold as required. This will relieve the Treasury, and the banks can well afford to spare the coin, as the receipts of idle funds from the interior almost balance the weekly outflow of gold. Last Saturday's bank statement showed an average loss of specie, amounting to only \$585,000. In

the surplus reserve a decrease of \$540,000 is shown as the result of all changes, leaving a sum of \$76,000,000 still held by the banks over and above legal requirements. Since May 1 \$83,500,000 gold has been exported, and about \$20,000,000 interior currency has been received; and yet the New York banks to-day hold just as much gold as they did at the opening of May. This, it is pointed out by a New York banking expert, simply means that gold has gone abroad largely because of a currency inflated under a bad convertible system, which has made easily possible the drawing away of Treasury gold without affecting the floating volume of the currency.

There is no appreciable change in monetary conditions. The supply of loanable funds continues to be largely in excess of the requirements. Call money is still 1% and time money is freely offered by the various financial institutions at 1% for 30 days, 1½% for 60 days, 2% for 90 days, 2½% for four months, and 3% for longer periods. Mercantile paper is in excellent demand, but the offering of good names is meager. Rates are quoted at 2½% @ 3% for prime indorsements, 3% @ 3½% for first-class single names, four months to run, 4% @ 5% for others.

Speculation on the Stock Exchange has been almost at a standstill during the week, and the market closes rather lower all round. Sugar, Chicago Gas and a few other industrials, which are more or less the sport of rings and pools, have, as usual of late, absorbed the lion's share of the dealings. Railroad shares have been stagnant, except in the case of some of the bankrupt roads, as Atchison, Northern Pacific preferred, Union Pacific and Reading, which sold rather briskly on a decline early in the week. The practical completion of the Atchison reorganization plan, with its \$12 assessment, appears to have convinced the stockholders of other roads similarly placed that they also will have to make substantial contributions in order to retain their proprietary interest in the companies, and they followed the lead of Atchison shareholders in endeavoring to dispose of their holdings before the assessment was formally announced. This led to the selling movement of Tuesday, when the stocks of bankrupt roads declined with one accord. The granger stocks, however, remained firm, although the market in general closed weak. Union Pacific was sold down three points on reports of a heavy assessment and of steps by the Government to force the payment of the Government debt, added to the continued unfavorable returns of earnings and losses to the road by floods. Nevertheless the officers of the Union Pacific assert that the July interest will be paid in full. The extreme fluctuations in the more active stocks during the week are shown in the following list, together with closing prices on June 20:

	High- est.	Low- est.	Closing June 20.
Ama. Sugar Ref.....	101½	96½	97½
Atchison, T. & S. Fé.....	7½	6	6½
Chicago Gas.....	79½	75½	79½
Chic., B. & Q.....	78½	76½	77½
Chic., Mil. & St. Paul.....	61½	59½	60½
Distilling & Cattle Fdg.....	25½	24½	23½
Louisville & Nashville.....	46½	44½	45
Missouri Pacific.....	28½	27½	27½
National Lead, Common.....	38½	38	39
N. Y., L. E. & Western.....	13½	12½	12
Northern Pacific, Pfd.....	17	13½	14½
Philadelphia & Reading.....	17½	15½	16½
Tennessee Coal & Iron.....	20½	19½	19½
U. S. Cordage.....	23½	19½	23
Union Pacific.....	18½	9½	10½
Western Union.....	85½	84½	84

Railroad bonds are lower, and the general bond market has been hardly up to the level of former weeks, except for city mortgages, which have commanded an active sale at good prices. Government bonds have been steady, with moderate sales. Closing quotations were as follows:

	Bid.	Asked.
2½s, 1891, registered.....	96	.....
4s, registered.....	113	113½
4s, coupon.....	114½	115½
5s, registered.....	118	118½
5s, coupon.....	118	118½

The market for sterling exchange has been dull and firm. The demand from remitters was rather more brisk on Tuesday, but the supply of bills is small. Rates have been marked slightly higher, actual business being done on Wednesday at \$4.87½ @ \$4.87½ for 60 days, \$4.88½ for demand, \$4.89 for cables and \$4.86½ for commercial. Domestic exchange on New York is quoted as follows: Chicago, 75¢ premium; New Orleans, commercial 100 premium, bank 150 premium; Charleston, buying par, selling ½ premium; San Francisco, sight 12½, telegraph 15; Boston, 5¢ @ 10¢ premium.

Bar Silver is rather weaker, being quoted on Wednesday at 28½ pence @ ounce in London and 62½ cents in New York. Some heavy shipments of the metal have been made during the week. Exports, exclusive of specie from the port of New York for the week ending June 19, were \$6,446,940, against \$7,441,345 for the corresponding week of 1893.

## New York.

Office of *The Iron Age*, 96-102 Reade street, }  
New York, June 20, 1894. }

**Pig Iron.**—Sellers complain generally of a very small volume of business and light inquiry. We note a sale of 500 tons Bessemer Pig at an equivalent of \$13, tidewater. We quote standard brands \$12.50 @ \$13 for No. 1; \$11.25 @ \$12 for No. 2, at tidewater. Southern Iron, same delivery, \$11.50 @ \$12.25 for No. 1; \$10.50 @ \$11 for No. 2; \$10 @ \$10.25 for No. 3; \$10.25 @ \$10.75 for No. 2 Soft, and \$10.50 @ \$11 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$9.75 @ \$10.25.

**Cast Iron Pipe.**—Only four bids were received on the Rochester order of 6000 tons, R. D. Wood & Co. naming \$19.35 for the 36 inch A and B; the Radford Foundry \$18.30 for all except the 36-inch, and Howard Harrison \$18 for the 36-inch B. The contract for 2576 tons of Pipe for Lowville, N. Y., was taken by Scottdale at \$19.17. On the Penn Yan order for about 1000 tons the Lake Shore Foundry bid \$18.85, while the Warren Foundry was lowest on a small lot for Norwalk, Conn., at \$22.60, all prices being delivered.

**Manufactured Iron and Steel.**—Pretty good prices are still obtained for small lots for prompt delivery, and in some cases buyers of Beams must pay for wastage for cutting up longer lengths. The Beam mills have been forced during the scarcity of coal to cut into their stock very deeply in order to fill prompt orders. During the week the representatives of a large Pittsburgh mill took the material for the Pyle, Salvation Army and Fidelity buildings, the total aggregating from 1800 to 2000 tons, of which the first requires about 1500 tons. There has been quite a good deal of activity in Cotton Ties lately. The earliest sales

of the season were made at 55¢ @ bundle, then 60¢ was asked and obtained, and now 65¢ at mill is quoted @ 45 lb bundle, for Steel Cotton Ties. We quote: Beams up to 15-inch, 1.40¢ @ 1.50¢ for round lots; Angles, 1.30¢ @ 1.35¢; Universal Mill Plates, 1.25¢ @ 1.35¢; Tees, 1.50¢ @ 1.60¢; Channels, 1.40¢ @ 1.50¢, on dock. Steel Plates are 1.35¢ @ 1.40¢ for Tank; 1.45¢ @ 1.50¢ for Shell; 1.60¢ @ 1.65¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.20¢ @ 1.9¢, on dock, and Common 1.10¢ @ 1.20¢; Soft Steel Bars are 1.20¢ @ 1.30¢; Scrap Axles are quotable at 1.35¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.40¢ @ 1.50¢, delivered; Cotton Ties, 70¢ @ 75¢ @ 45-lb bundle, tidewater; Machinery Steel, 1.20¢ @ 1.40¢; Toe Calk, 1.75¢ @ 1.90¢, and Sleigh Shoe, 1.60¢ @ 1.75¢, delivered.

**Ferromanganese.**—Domestic Ferromanganese is selling so low—\$50 @ \$52: Pittsburgh—that foreign is being beaten at all points, the nominal quotation being \$52.50 @ \$54.

**Steel Rails.**—The demand continues lifeless, with prices held at \$24.80, tidewater, for standard sections. It is rumored that there are signs of uneasiness in the Rail trade. In Girder Rails higher prices are being asked, and there has been some defaulting on deliveries by mills which have been forced to remain idle through the Coal strike.

**Track Material.**—We quote as follows for small lots: Spikes, 1.50¢ @ 1.70¢; Fish Plates, 1.20¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @ 2.10¢, and Hexagon Nuts, 2.10¢ @ 2.30¢, delivered.

**Billets and Rods.**—The market is quiet with quotations nominally at \$19 @ \$19.50 for domestic. Wire Rods are \$27 @ \$27.50, tidewater.

## British Metal Market.

[Special Cable Dispatch to *The Iron Age*.]

LONDON, WEDNESDAY, June 20, 1894.

Pig Tin prices have undergone very little change. Five shillings covers the extremes between highest and lowest prices during the week. There was a drop to £70 for prompts, due to absence of speculative support; subsequently a slight reaction on improvement in silver and slightly more American inquiry, and eased on slackened demand, although controlling interest in stocks is held by prominent operators. The latter are very indifferent sellers and are represented to be holding confidently in anticipation of large American demand shortly. Local trade demand has been moderate. Straits shipments to Europe first half of the month were 2010 tons. At the close the market was barely steady at £70. 2/6 @ £70. 5/ for prompts and £70. 10/ @ £70. 12/6 for three months' futures.

Copper has dropped nearly 12/6 or to £37. 18/9 for Merchant Bar prompts and correspondingly for other varieties. Lack of speculative interest and realizations by holders, together with certain operators bearing the market, brought about the decline. Adverse statistical

position also had somewhat unfavorable effect. Chili charters were advised as having been 1100 tons during the first half of the month. Spot stocks increased 1973 tons, and the visible supply gained 1573 tons. Closing prices were £38 @ £38. 2/6 for Merchant Bar, prompt delivery, £38 7/6 @ £38. 10/ for do., three months' futures, and £41 for best selected English.

Tin Plate prices have further hardened, but the demand is not equal to expectations. Forward business is restricted, as sellers expect a good advance shortly. Fair sales have been made of 14 x 20 Bessemer Cokes at 10/3 and Siemens at 10/6, f.o.b., Swansea. Present quotations at that point are as follows:

Bessemer Cokes, 14 x 20..... @ 10/3  
Siemens Cokes, 14 x 20..... @ 10/6  
Ternes, double box..... @ 19/  
Charcoals..... 13/ @ 15/

The Cynon and the Nantyglo Tin Plate works are restarting.

Black Plate continues in good demand and prices are stiff at £8. 2/6, f.o.b. Swansea.

Pig Lead has been in limited demand and prices are easier, at £9 @ £9. 2/6 for Soft Spanish.

Spelter has weakened to £15. 7/6 @ £15. 10/, with only moderate business at the decline.

Pig Iron warrants have ruled somewhat higher, but business is only fair. Latest dealings were at 41/11 for Scotch, 35/6 for Cleveland and 44/9 for Hematite.

### Recent Treasury Decisions.

#### *Drawback on Tin Handles, Nozzle Bodies, and Caps Attached to Tin Cans.*

On high tin handles made from imported IC tin plate, and on low screw tin nozzle bodies, and flat tin caps made from imported taggers tin, attached to 5-gallon tin cans manufactured and exported by the Standard Oil Company of New York, Sone & Fleming Works, a drawback will be allowed equal in amount to the duties paid on the quantities of imported materials used in the manufacture of such articles, less the legal deduction of 1 per cent.

The quantities so used may be determined by allowing 40 pounds of IC tin plate for each 1000 high tin handles, 10 pounds of taggers tin plate for each 1000 low screw tin nozzles, and 7 pounds of taggers tin plate for each 1000 flat tin caps.

#### *Drawback on Steel Clock Spring Material.*

On the exportation of steel clock spring material, rolled, tempered, polished and prepared for cutting into lengths suitable for clock springs, manufactured by R. H. Wolff & Co., Limited, of New York City, from imported steel wire rods, a drawback will be allowed equal in amount to the duty paid on the rods used in the manufacture, less the legal deduction of 1 per cent.

The quantity of imported rods so used shall be determined by adding to the net weight of the exported article, as certified by a United States weigher, 16 per cent. of such weight.

The drawback entry must specify the size of the clock spring steel material and

the gross and net weight of each package to be exported, and the manufacturers' declaration on the entry must show that the article was manufactured in accordance with their sworn statement dated August 9, 1893.

#### *Drawback on 1 and 2 Gallon "Round" Tin Oil Cans.*

On the exportation of 1-gallon and 2-gallon "round" tin cans manufactured by the Standard Oil Company of New York at the Devos Works a drawback will be allowed equal in amount to the duty paid on the quantities of imported pig tin and pig lead used in soldering such cans, less the legal deduction of 1 per cent.

The quantities of such tin and lead which may be taken as the basis for allowance of drawback shall be for 1-gallon cans 64 per cent., and for 2-gallon cans 73 per cent. of the allowance provided in the instructions of January 26, 1894 (Synopsis 14,592), for 5-gallon rectangular cans, subject to the special provisions and limitations of said instructions.

#### *Hunting Knives—Certain Pocket Lock Knives Not.*

Before the U. S. General Appraisers at New York, March 5, 1894. In the matter of the protest, 58,281 a-13,927, &c., of A. Kastor & Bro., et al., against the decision of the Collector of Customs at New York as to the rate and amount of duties chargeable on certain pocket knives or lock knives imported per the vessels and at the dates named in the annexed schedule. Opinion by Wilkinson, General Appraiser.

The goods are knives with horn or bone handles. Each has one large and one small blade; some of them have corkscrews, picks, &c., in the back, and all of them have lock springs to keep the large blade fixed when open, the knife being shut by pressure upon the small blade. The merchandise was assessed for duty under the provisions of paragraph 165, N. T., for pocket knives, and is claimed to be dutiable under the provisions of paragraph 167 for hunting knives. Paragraph 165 provides for "pocket knives of all kinds."

We find that the knives in question are designed to be carried in the pocket; that they are so commonly carried, and that they are in fact pocket knives.

The protests are overruled accordingly.

At a meeting held in Pittsburgh on Saturday, the 16th inst., the Pittsburgh Slack Coal Agency was dissolved. On account of the coal strike the price of slack has been considerably higher, and some of the operators in the Pittsburgh district have been selling their product outside of the pool. Others refused to remain in the agency unless the practice was stopped, and as no assurance of this could be secured, it was decided to dissolve. Slack will hereafter be disposed of by individual operators.

A fresh attempt is being made to manufacture iron at Onehunga, in New Zealand. Some men formerly employed at the Eskbank Iron Works, at Lithgow, New South Wales, have gone to Onehunga and are starting the works on the co-operative principle.

Torpedo nets for protecting the sides of war vessels have been rendered useless by the invention of torpedo scissors, which, fixed on the torpedo, are capable of cutting through any nets yet made. The invention is an English one. It

was recently tested by a British warship, when the scissors cut through two nets and the torpedo proceeded unimpeded on its journey of destruction.

### CONTENTS.

	PAGE.
Electrically Driven Boring Mill. Illus.....	1181
The Johnson Cast Projectile.....	1181
Garrett on Capital and Labor.....	1182
The Barr Air Lock. Illustrated.....	1183
The Mechanical Engineers. Illustrated.....	1184
The Trouble at Duquesne.....	1188
Tools for Turning Pins and Rivets. Ill.....	1189
San Francisco News.....	1189
Proper Connection of Steam Boilers and Engines. Illustrated.....	1190
Tests of Tandem Compound Blowing Engines. Illustrated.....	1192
Coking and Utilizing Black Band Ores.....	1192
Correspondence.....	1193
The Week.....	1195
Editorials:	
Features of the Coal Strike.....	1196
The Farm Machinery Trade.....	1196
Cultivating Foreign Markets.....	1196
Electrolytic Brands in the Copper Trade.....	1197
Cheap Scrap and the Basic Open Hearth Furnace.....	1197
Washington News.....	1197
Personal.....	1198
Manganese Ore in Russia and Greece.....	1198
Cast Iron vs. Forged Soft Steel Brake Shoes.....	1198
The Haskell Gun.....	1198
Manufacturing:	
Iron and Steel.....	1199
Machinery.....	1199
Hardware.....	1199
Miscellaneous.....	1200
Obituary.....	1200
Wire Ropes.....	1200
The Metal Trades:	
Chicago.....	1201
Philadelphia.....	1202
Pittsburgh.....	1202
St. Louis.....	1203
Cincinnati.....	1203
Metal Market.....	1204
Financial.....	1204
New York.....	1205
British Iron and Metal Markets.....	1205
Recent Treasury Decisions.....	1206
Hardware:	
Condition of Trade.....	1207
Notes on Prices.....	1209
Hardware Organizations.....	1209
Artistic Printing.....	1209
Export Notes.....	1210
Letters from the Trade.....	1210
Injunction.....	1210
Julius Berbecker & Co.....	1210
Hardware Club.....	1211
New England Hardware Dealers' Association.....	1212
The Richmond Meeting.....	1215
Trade Items.....	1217
Price-Lists, Circulars, &c.....	1217
It Is Reported.....	1217
Paints and Colors.....	1218
Enterprise Grater No. 93. Illus.....	1218
Monitor Aluminum Juice Extractor. Illustrated.....	1218
The Champion Filter. Illustrated.....	1219
The Goodell Bread and Cake Knife. Illustrated.....	1219
Wick Raising Movement and Lighting Lift. Illustrated.....	1219
Zeolithe.....	1219
Millers Falls Automatic Screw Driver and Borer. Illustrated.....	1220
Fish Tail Wood Carving Tools.....	1220
Corrugated Slaw and Kraut Cutters. Illustrated.....	1220
Enterprise Juice Extractor No. 21. Ill.....	1220
The Lobl Tanners' Shears. Illus.....	1220
Aluminum Juice Extractors. Illus.....	1221
The Open Sesame Tubular Lantern. Illustrated.....	1221
The Belfast Sell Fast Clothes Racks. Illustrated.....	1222
Tubular Steel Hitching Post. Illus.....	1222
Current Hardware Prices.....	1223
Current Metal Prices.....	1230



# HARDWARE.

## Condition of Trade.

**T**RADE CONTINUES in moderate and diminishing volume, as is expected at this season. Some of the larger houses are covering their requirements for early fall trade, but orders are placed conservatively and not for as large quantities as usual, the policy of keeping near the shore being still quite generally followed. There is a fair though not heavy business from the smaller trade, with many of whom the demand is much more limited than usual, and they are accordingly keeping their stocks down to as low a point as possible. The declines which have occurred in prices during the past year induce a closer adherence to this policy than would be the case if the market had not for a long time been a declining one. Whether the bottom has yet been reached is a question which careful men are canvassing. It is the opinion of many manufacturers that prices in many lines are not at all likely to go lower, and when the reaction comes from the sluggishness of trade, it is considered probable that there will be a strengthening in values, in some lines at least, and a scarcity of some goods is not improbable. It is hoped that the tariff question, the delay in the settlement of which is having so mischievous an influence on business, will be disposed of before long, so that there may be at least an opportunity for a good fall trade.

### Chicago.

Extremely hot weather prevailed all over the West last week, causing an unusually heavy demand for Refrigerators, Window Screens, Screen Doors and other summer goods. The large number of rush orders thus received indicated very forcibly the conservatism with which retail merchants had purchased stocks of such goods in advance of the season. Ordinarily, the demand would have been light for some time after the advent of hot weather, or until first stocks had been run off. Now, however, the demand is thrown at once on the jobbers, which shows that they have been made to carry the stocks. Movements of this kind are to be expected in every class of goods, as the occasion arises for their use. Hand to mouth buying keeps down stocks in retailers' hands below their normal size, and there is

no allowance for even a slight increase in local consumption. Other lines of goods in Shelf Hardware are moving in about the same volume as heretofore, orders being small for sorting up, yet fairly numerous. Sales in the aggregate are running about even with last month. Sheet Iron is beginning to move from jobbers' hands at last. They are receiving plenty of inquiries for prices for immediate delivery and are quoting prices for small lots, which are about what manufacturers charged last year. The stove trade is picking up to some extent. Orders are now being booked for fall delivery, and among them are not a few for good sized stocks. Very dry weather has prevailed through the West for the past three or four weeks, causing a great deal of apprehension for the crops now growing, but on Friday and Saturday local rains broke the drouth and prospects have greatly improved.

### St. Louis.

(By Telegraph.)

The demand for shelf goods shows a steady improvement, and the present month will likely prove more satisfactory than was thought during the early part. In some lines a decided scarcity is reported. This applies more particularly to Tin Plates, Black Sheets and Galvanized Iron. Plain Wires are also scarce and hard to obtain except at the advanced prices. Barb Wire and Wire Nails are moderately active and prices are firmly maintained. Builders' Tools and supplies are slow to move and heavy Hardware is only in moderate demand. The annual midsummer dullness will shortly be in order, and jobbers are making their preparations accordingly. Collections are excellent.

### Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—The jobbing Hardware situation cannot be said to have been materially altered during the past two weeks. Trade is moving steadily along the lines noted in our last report, and no new features of importance have been developed. The condition of the crops in the country continues to be the ruling factor in all lines of business.

The long drought caused considerable anxiety and discouragement, especially among farmers, and the business community were likewise apprehensive. The small grain and grass were much damaged, and from a third to a half crop of wheat and oats is all that is expected in many sections where hope had almost been abandoned. Corn did not suffer to any extent, and the rains that have visited the State recently have brightened the prospects in no small degree.

Everything appears to depend upon the atmospheric conditions at this time. From now until September business men will watch with eager anxiety the least change, favorable or unfavorable.

Sufficient moisture means a good corn crop, and a good corn crop means prosperity. The acreage of this cereal is reported to be larger this year than ever, and it might be said that corn is king, as far as the territory connected with this market is concerned.

### Baltimore.

CARLIN & FULTON.—There is nothing in the condition of trade new enough to remark upon. From the far South we expect very few orders at present and as all predictions for future business in that section must be based upon the growing crop of cotton and its value, it is too early to hazard an opinion.

Adjacent to our city the wheat harvest is at hand and as the general use of the Mower and Reaper has not entirely driven out the Scythe and Cradle we are now getting in quite a number of small orders for such goods as are strictly seasonal.

We regret that in one section of our State where trade should be good, it is paralyzed by the strike of the coal miners and threatened violence compels the presence there of a strong military force.

Unfortunately the walking delegate has had more to do than the traveling salesman, and he has succeeded in this State in getting our miners to strike through sympathy with the efforts of other sections in order to make it a national issue, and now that it has been left to each section to settle its own differences our sympathetic miners are left alone in their struggle, while those for whom they took the step have adjusted their troubles in most cases.

We hope before our next letter that in this section, at least, these labor troubles will have ended and business resume its normal condition.

### San Francisco.

MILLER, SLOSS & SCOTT.—Business during the past two weeks shows no improvement over the preceding ones. There has been no increase in prospects for a crop, so that we cannot look for any marked increase in business for the remainder of this season.

The outlook for good returns for fruit continues favorable, so that our fruit growers will probably be the only members of our farming community who will do well this year. Though fruit growing is a very large industry in our State, it is not by any means the most important, and on the whole we might say that our farmers do not anticipate a prosperous year.

We note a tendency on the part of our merchants to buy practically from hand to mouth, and under this state of affairs we cannot expect trade to improve until the fall.

Considering the prospects, we find that collections are as good as in previous years at this season.



**Portland, Oregon.**

**CORBETT, FAILING & ROBERTSON.**—Trade continues moderate and collections are lighter than they were last month. The payment of taxes uses up a large amount of money. April 1 is the legal limit of time, but local authorities have this year granted an extension of time, varying in the different counties, so that even yet a considerable amount remains uncollected. Enough, however, has been paid in to withdraw from circulation in the interior nearly all the ready cash, and remittances have been correspondingly reduced. Of course both State and county treasurers will soon have paid out a large part of their receipts redeeming outstanding warrants, but meanwhile tight times are made tighter.

A late spring and an early summer seem to be the order of events this year.

The extremely low freight rates from the East to the Pacific Coast, together with low prices in our line, do not seem to have induced unusually large orders from jobbers here; in fact, conservatism has been the rule among all. Now, however, in view of the fact that rail rates are apt to be advanced on short notice and the continuance of labor troubles indicates a short supply, there is manifestly a greater inducement to provide for future needs. The withdrawal of quotations by some Eastern manufacturers and slight upward tendency in price in some lines has had the effect of stiffening jobbers' prices, but no great advances are made or even looked for. Declines are checked, and that is something; and we possess our souls in patience, waiting for permanent results.

**Philadelphia.**

**SUPPLEE HARDWARE COMPANY.**—The summer season has how so far advanced that trade is likely to remain quiet during the balance of the month, and business houses are governing themselves accordingly, beginning the vacation of their employees at an earlier date than usual. This plan will collect their forces together earlier than usual for what trade there may be in sight for the early fall.

There are quite good prospects that the bituminous coal strikers will accept a compromise offer, and thus the coal famine will at least be partially relieved, although the strike may be temporarily continued in some sections and by some of the strikers; but the backbone will evidently be broken. The effects of the coal famine, however, will bear heavily upon the participants for many months to come.

It was most unwise for the strikers to drive so large a number of persons out of employment at this time. It has been destructive in its tendencies and suicidal financially, and has cast a gloom over many households.

We place but little credence, however, in the opinion that the industrial enterprises have suffered in the coal strike. We do not think industrial operators have been much affected, as they have no heart to resume operations until they have a larger number of orders than is now in sight to guarantee resumption.

We find none of them inclined to resume until a more sanguine feeling is shown, or more business or more orders are in sight. This is not likely to change so long as the tariff schedules are so unsettled.

Congress is condemned on all sides by merchants, manufacturers and laborers, and by the voters of both political parties, for this apparent indifference to the existing conditions of the country. The Representatives there assembled appear to be quite indifferent to the fact that no improvement in trade conditions is probable until the decision of Congress is made known and becomes a law to the land.

If half the effort was displayed by the Representatives in Congress, and partisan feelings sacrificed in order to place our suffering country once more on the wave of prosperity, that was shown by the members of the Southern Hardware Jobbers' Association at their convention in Richmond, it would be but a short time before Congress would be able to adjourn.

The writer, who was an invited guest at this convention, was much pleased with the various papers that were read and the intelligence displayed, not only in the preparation of the papers, but in the discussion of matters that came before the convention.

It was an opportune time to have many of these questions settled. Manufacturers were able to leave their homes, and deserve credit for having given their presence. So far as we can learn, all were well pleased with the moderation displayed in discussing questions, as well as the motives which induced the invitations.

Collections as a whole cannot be looked upon as entirely satisfactory. This, however, is nothing more than one would naturally expect in glancing over the entire field of our country, and taking into consideration the various conditions that have struck the channels of trade.

**St. Paul.**

**FARWELL, OZMUN, KIRK & Co.**—We have now reached the season when all eyes are turned toward the fields, and the uppermost question is the condition of the crops. A few days now may be of vital importance as we reach the critical period. Since our last there has been a protracted spell of excessive heat, with hot, burning winds, the latter being a very unfavorable feature, greatly promoting the drying up of the surface moisture and beginning to tell seriously on the small grain and the grasses on the lighter sand soils. However, rain began to fall the 14th inst., and great relief has already been experienced, and it is probable that we are now entering on a spell of rainy weather, which we frequently have in June.

The dry weather has been very favorable to the deep rooting of the grain that has withstood the ordeal, and it has also checked the growth of noxious weeds, which will greatly improve the crop, and with favorable weather there will be a good harvest.

The area is small in which any considerable damage has been done, and the stand of the grain is generally quite satisfactory.

Trade is moving along quietly, waiting for the approach of the harvest to see what the outcome will be. In the mean time small orders and many of them is the programme adopted by the retail dealers and fully approved by the jobbers.

Our merchants generally believe that the effects of the Tariff bill have now been substantially discounted, and except in a few lines of goods they do not anticipate any considerable changes from what has been expected as probable.

Prices are fairly well maintained, and there is less complaint of cuts and other vicious practices than usual. Collections are fair.

**Cleveland.**

**THE W. BINGHAM COMPANY.**—A comparison of sales with the corresponding period of 1893 will not show hereafter so great a deficiency as previous months have done, for the depression was first felt by us about this time last year. As compared with May, trade is keeping up fairly well, and it is possible that owing to the fact that dealers have only light stocks to draw from, the usual falling off of business will not be so pronounced this summer as in former years. Prices still remain unsteady, and the advances noted on Wire and Wire Nails have given way to a small decline on these commodities. Orders for fall goods are commencing to come in, but do not indicate any great increase of trade for this year; retailers being conservative in their estimates of future business. Collections are good.

**Louisville.**

**W. B. BELKNAP & Co.**—Business continues of moderate volume, as is not unusual in June. The 1st of July is in sight, however, the time chosen for adjustments of country accounts, and maybe there will be something better to report hereafter. It is natural that buying should be light, as the harvest fields are ripening, but after their yield is once on the way to the market, particularly in the light of recent advances of several cereals, we look for increased exchange of commodities. The heavy freeze in April was most disastrous in its effects horticulturally, and a well posted observer and business man reckons that there is not a bushel of peaches between Montgomery and Indianapolis. This means no fruit jars sold and a lack of ready money in the countryman's pocket, which the fruit crop is always counted on to furnish.

Business must continue to shape itself to present conditions, which are not favorable to any expanse, but, of course, it is thus laying the foundation for stability in the future.

When we shall have gotten through with Senate discussions on tariff and the entertainment of Coxey's or Kelly's armies, or their smaller imitators, as though they were the most distinguished citizens of the Republic; when we are able to correct the idea that idleness, waste and destruction mean profitable employment and consequent prosperity, we shall be on the up grade. The right to demand work of one's own choice and at hours and compensation of his own fixing has got to be educated out of many a one—mainly foreign born citizens, who think it is the true political economy. Just what form this education will have to take must be determined by events.

Among signs of the abundance of money unprofitably employed, we would mention a new issue of local gas stock of \$600,000 par value, which was sold in a few minutes at our Board of Trade a week since.

Four of our national banks, with an aggregate capital of \$1,600,000, have just consolidated, reducing the capital stock one-half, liquidating the other 50 per cent. From the Kentucky 'Merchants,' Second and Fourth National has arisen the American National.

One large St. Louis bank, with a capital of \$2,000,000, has returned half its capital stock to shareholders, explaining that it could not now profitably utilize the larger amount. The same movement has been carried out by one of the leading national banks of Den-

ver. This is one of the many evidences of contraction of business.

With low rates for money and the insolvent concerns weeded out there will come in time an era of returning confidence (if our legislatures do not attempt to do too much for us and our taxes of all sorts be made not too heavy) that will mean prosperity for us, or at least for those of thrift and economy who survive the interval. Just what will attract capital most is an interesting speculation.

#### New Orleans.

A. BALDWIN & CO.—A slight improvement in builders' line, but not enough to be encouraging, as it is caused by the number of large buildings being erected in this city. It is very quiet in the country trade—not many buyers in the market. Cut in freight rates does not increase orders to any extent, as merchants will not buy except for actual wants, even with the advantage of low prices and low rates of freight.

### Notes on Prices.

**Wire Nails.**—There is a perceptible falling off in the volume of business and most of the mills are well up with their orders. Some of them, in view of the summer dullness, are curtailing their production and preparing to close altogether for a few weeks. The price of \$1.10 for carload lots at mill is well maintained. Small lots from store in New York are held at \$1.25 to \$1.30.

**Chicago.**—Manufacturers report trade very quiet. Even inquiries are light. The factories are reducing their output, either getting down to single turn or stopping entirely. Prices are very firm at \$1.20 to \$1.25, Chicago delivery. The local situation is now much better, as prices have been relieved of their irregularity. Jobbers' large stocks have been worked off, and a uniform rate of \$1.25 is quoted on small lots from stock. While the demand from retailers is not heavy, as they are buying merely what they absolutely need, no objections are raised to the payment of this price.

**Cut Nails.**—The price remains the same as given in our last report, the market being represented by the quotation of 95 cents to \$1 for carload lots of Nails delivered on dock in New York. Small lots from store in New York command \$1.10 to \$1.15. The demand is only moderate. The Western manufacturers are not competing so vigorously for Eastern trade as a short time ago. A number of the mills are preparing to shut down.

**Chicago.**—Local manufacturers are in receipt of a good run of orders, which have accumulated to such an extent that they are anxious to resume operations, but are still unable to do so for lack of coal. Prices are unchanged at 90 to 95 cents for 55-cent average. Jobbers quote \$1.10 to \$1.15 for small lots from stock.

**Barb Wire.**—The Barb Wire market is quiet and the mills generally have pretty well cleared up their order books.

Prices are well maintained on the following basis for Four-Point Galvanized, delivered: Pittsburgh, \$2.10; Cleveland, \$2.15; Cincinnati or Allentown, \$2.30; Chicago or New York, \$2.35.

**Chicago.**—Dullness now pervades the trade in Fence Wire, but there appears to be no weakness in prices. The last advance made is maintained. Jobbers report a very light movement from stock and continue to quote Galvanized at \$2.35 to \$2.40 for small lots and \$2.20 to \$2.25 for carloads.

**Sheet Lead, Lead Pipe, &c.**—A reduction has been made by the manufacturers of these goods under date June 20, the following revised prices being announced, which are subject to the usual discount of 20 per cent.:

	Cents per lb.
Lead Pipe.....	5½
Block Tin Pipe.....	35
Sheet Lead.....	6½
Tin Lined Pipe.....	15

**Cordage.**—There is only a moderate demand for Rope, but prices are steadily maintained. The market is largely in the hands of jobbers as the result of the repeated advances, which gives them an opportunity to sell at factory prices. Large lots, f.o.b. factory or New York, are selling at the following quotations, which are subject only to a discount of 1½ per cent. for cash:

	Cents.
Manila, base.....	7
Sisal, ".....	5
New Zealand, base.....	5

**Great American Fish Scaler.**—Covert's Saddlery Works, Farmer, N. Y., who are putting this article on the market, are selling it to the trade at \$1 per dozen net. The Scaler was described in our last issue.

**Electric Lawn Mower Sharpener.**—This article was described in *The Iron Age* May 31, as put on the market by the Troy File Works, Troy, N. Y., for whom Geo. M. Matteson is agent, 111 Duane street, New York. It is sold to the trade at \$6 per dozen, subject to a discount of 40 per cent.

**Glass.**—The market on American Glass continues to stiffen as the date for the annual closing down of factories approaches. Some factories have been obliged to close on account of lack of fuel, while others have closed because of the hot weather. One of the largest factories in the Pittsburgh district will close next week, a week ahead of the regular date for closing. The demand is reported fair in small quantities, and orders as being numerous. It is understood that Pittsburgh manufacturers are not inclined to accept new orders at 85 per cent. discount, while the New York market is represented by quotations of 80 and 20 per cent. discount for single or double strength Glass in any quantity. Reports indicate that Plate Glass factories are well supplied with orders, and that prices show firmness at quotations of 70 to 70 and 10 per cent. discount, with an advancing tendency.

## Hardware Organizations.

### Western New England Iron, Steel and Hardware Association.

The Western New England Iron, Steel and Hardware Association held a meeting on June 8 at Hill's Homestead in West Haven, Conn. Thirty-four of the Hardware and Iron dealers of the section covered by the association were present. The principal work accomplished at the meeting was the establishment of a uniform price at which dealers should sell Horseshoes. The meeting was a very successful one and the association is making very gratifying progress. After the meeting a fine fish dinner was served, and subsequently the company listened to addresses by Charles H. Breck and Frederick H. Butts of the New England Iron and Hardware Association, in which some of the features of that organization were dwelt upon. Several members then spoke, and Harry H. Ensign entertained the company in a lighter vein.

### New England Iron and Hardware Association.

New England Iron and Hardware Association was incorporated under the laws of Massachusetts in May, and held its first election under the new charter June 12. The following were selected to serve one year: E. L. Haley of Dodge, Haley & Co., president; A. M. Wiley of Frye, Phipps & Co., vice-president; Frederick H. Butts of Butts & Ordway, clerk; Charles H. Breck of Joseph Breck & Sons Company, treasurer. These, with the following, constitute the Board of Directors: Chas. C. Adams of Sargent & Co.; J. K. Whipple of Fitz, Dana & Co.; W. C. Chamberlin of Emery, Waterhouse & Co., Portland, Me., and Chas. H. Bolles of Bolles & Wilde. It was decided to hold the next meeting at Providence, R. I., July 17. This meeting is to be something in the nature of an outing, and it is understood, will be held at a popular club house down the river.

## Artistic Printing.

RECENT circulars and pamphlets have shown a marked advance from an artistic standpoint over those of former years, especially in some lines of business. This advancement has not been confined to the quality of paper or the interior arrangement of matter, but has been particularly noticeable in the covers. Embossed covers are growing in favor and many of them are executed in highly attractive designs and colors. It is doubtless true that the quality of stationery is often taken as an indication of a concern's standing, and that a highly artistic embossed cover on a catalogue creates a good impression at first glance. Griffith, Ax-tell & Cady Company, Holyoke, Mass., who design and make catalogues complete, including engravings, and whose advertisement appears in this issue, have published samples of covers in book form, entitled "A Mint of Hints." These samples include a collection of original embossed catalogue

cover designs, and cover various lines of business. They will be of interest to those who are giving attention to the matter of artistic printing.

### Export Notes.

**SHERMAN & LYON COMPANY,** 100 Chambers street, New York, and Melbourne and Sydney, Australia, announce that in view of the fact that the quarters in Sydney which they have occupied for the past year have proved insufficient for the accommodation of the increasing lines of American samples which they are handling, they have removed to more commodious offices at 3 Wynyard street. They also announce that they have associated with them at their Melbourne office W. E. Pickells, who for several years was resident manager for Jules Renard & Co. of Melbourne. Mr. Pickells will have charge of their Melbourne interests as local manager.

A. M. GRUNDY of Opp & Grundy, exporters, 15 Whitehall street, New York, recently sailed for London on a business trip *en route* to the South African colonies, Australia and New Zealand. Samples of goods made by American manufacturers, a number of which the concern represent, will be shown in London, and probably a branch establishment located there. From London the next stop will be at Cape Town, Cape Colony, and a year or more spent seeing old and new business acquaintances in the principal business centers of the different colonial towns, including Port Elizabeth, East London, Durban (Port Natal), &c., &c. It is their intention to establish a branch house in either Cape Town or Durban. Mr. Grundy will then proceed to Australia and New Zealand, where he has visited the trade for a number of years. Mr. Grundy was brought up in the export business by W. H. Crossman & Bro. and Arkell & Douglas.

### Letters from the Trade.

**Size of Cuts.**—The question as to the proper size of cuts for circular and catalogue use is one that is not altogether easy to solve. In many lines of goods there has been a tendency to make the cuts unnecessarily large, and perhaps, as indicated in the following extract from the letter of a prominent jobbing house, there is now a tendency toward rather smaller cuts:

Many manufacturers make a mistake in the size of the cuts they use, making them altogether too large. At the same time we are of the impression that the disposition has been in some late books to run to the opposite extreme, reducing the cuts to such a size as to make it impossible to bring out the design. Our impression is that the result will be a happy medium between the two, which up to the present time has not been touched.

**A Question.**—The following inquiry, which comes to us from a Hardware merchant in North Carolina, we take

pleasure in referring to our readers. We shall be glad to have their views in regard to it:

A dealer has an order for Norway Iron that he does not carry in stock and the customer wants it as soon as possible. There are two jobbers from whom the dealer has been buying this class of Iron, neither of whom apparently has any advantage over the other as to distance to the market. The dealer hasn't the time to get prices before placing the order, so orders one jobber to ship the Iron at lowest prices obtainable and writes to the other for his best price on same bill of Iron. The jobber who shipped the iron charged more than the other jobber offered to sell at. Should the dealer deduct the difference in making settlement? Jobber claims that he shipped the Iron at lowest price at which it could be obtained from him and says dealer has as much right to equalize his prices with those in Norway as to equalize them with prices of other jobbers in other towns. The dealer claims that the price was specified in order and if jobber could not meet the prices of his competitor he should have declined to ship. Who is right?

### Injunction.

**WE** give below copy of the injunction obtained by the Cary Mfg. Company, 5-9 Elm street, New York, against Hugh De Haven of the De Haven Mfg. Company, Brooklyn, N. Y. It was granted at a stated term of the Circuit Court of the United States in the Eastern District, second circuit, December 14, 1893:

Upon reading and filing the notice of motion for an injunction herein, the affidavits of Spencer C. Cary, verified July 29, 1893, October 25, 1893, and November 18, 1893, of Jerome Plunkett, verified August 17, 1893, of George C. Batcheller, verified November 17, 1893. Also those of Hugh De Haven, Chris Suhe, verified November 17, 1893, and William Duncan, verified November 13, 1893, and after hearing A. G. N. Vermilya, of counsel for complainant, and William C. Hauff, for defendant in opposition thereto, the same having been duly considered, and it appearing that letters patent of the United States, set up in the original and amended bills of complaint, viz., letters patent No. 403,178, issued May 14, 1889, to Spencer C. Cary, is a good and valid patent; that the complainant is the owner of the same, and that the defendant has infringed the rights secured by said letters patent aforesaid, by making and selling Box Straps containing the improvements claimed in and by letters patent No. 403,178, contrary to the statutes in such case made and provided; now, therefore,

*It is hereby ordered*, that injunction be issued out of and under the seal of this court, pursuant of the prayer of the bill herein, commanding and enjoining the defendant, Hugh De Haven, his agents, attorneys, clerks, carriers, servants and workmen and each of them, under the pains and penalties that will fall upon them and each of them in case of disobedience, and he and they forthwith desist from making, using or selling or otherwise disposing of or parting with any Box Straps containing or using the improvements described and claimed in said letters patent No. 403,178, or any part thereof, and particularly such Box Straps as heretofore made by you and herein determined to be infringements of said letters patent No. 403,178, and that you, Hugh De Haven, your

agents, attorneys, clerks, carriers, servants and workmen and each of them do so remain enjoined and inhibited until the determination of this cause on final hearing and the further order of the court in the premises.

### Julius Berbecker & Co.

**JULIUS BERBECKER & CO.**, importers and manufacturers, 65 Duane street, New York, also sole agents for the William Schollhorn Company and Tucker Mfg. Company, were completely burned out in a disastrous fire which began about 7.40 a.m. on June 14. A temporary office was immediately secured at 62 Reade street, and a large number of circulars printed and mailed before the day was over announcing the loss of their establishment, which had been occupied by them for 30 years. Their factories will be run overtime to make good their line of stock, and they hope only a week's delay will occur. All shipments will be made direct from factories at present. As many of their records have been destroyed the trade having unfilled orders will oblige them by sending duplicates. The loss is estimated at about \$90,000, insured for \$70,000 to \$80,000. Two of their safes remain intact, a third going down in the ruins. Julius Berbecker, who has been abroad on business two months, is expected back on receipt of cable sent him. The office is at present in charge of his son.

**KING HARDWARE COMPANY**, Atlanta, Ga., are sending to the trade reply postal cards, soliciting mail orders. The company state that they want 1000 mail orders from wideawake prompt paying merchants, and define their position by saying that they have the goods, that they were bought for cash, that their prices are right, that they ship promptly, and that their stock is clean and fresh. On the return portion of the card are ruled lines on which to write the order, headed by the words "Please ship quick."

**JOSEPH B. WILLIAMS**, well known to the Hardware trade of the South, has connected himself with the Yale & Towne Mfg. Company and will hereafter represent them in the territory south of Virginia and east of the Mississippi River. From 1881 to 1892 Mr. Williams traveled that country for P. & F. Corbin, and the past two years for Surpluss, Dunn & Alder and Reading Hardware Company. He will solicit business for the Yale & Towne Mfg. Company on their full line, including Shelf Hardware, Post Office Supplies and Cranes.

**HENDRICKS & CLASS**, manufacturers' agents for foreign and domestic trade, 256-257 Broadway, New York, have begun business at the above address on their own account. They were for 14 years in the employ of H. B. Newhall Company. They will deal in Heavy Hardware, Ship Chandlery, Railway Supplies, Brooms, Brushes and Broom Manufacturers' Supplies. For the present they expect to do a direct commission business. Later, if advisable, they contemplate carrying a stock of goods in New York. They will give especial attention to the export trade, with which they have long been familiar.

## Hardware Club.

**THE ADJOURNED ANNUAL MEETING** of the Hardware Club was held at the club rooms on Thursday, June 14, at 1.30 p.m. At that time reports were made by the president and treasurer explaining the status of the club and what had been done by the Board of Governors in equipping it. A resolution was unanimously carried approving the action of the Board of Governors and recognizing the value of the service rendered by them.

An election of five governors was held, resulting in the re-election of the following persons: Eugene Bissell, Thos. F. Keating, J. H. Kennedy, J. L. Varick and R. R. Williams.

At a subsequent meeting of the Board of Governors the following officers were unanimously re-elected:

WILLIAM H. WILLIAMS, president.  
ROBERT H. SWAYZE, vice-president.  
J. L. VARICK, secretary.  
THOMAS F. KEATING, treasurer.

The committees on Finance, Admission and Library were reappointed, and House Committee constituted as follows: Eugene Bissell, chairman; Brace Hayden, Arthur G. Sherman, Edward C. Van Glahn, John L. Varick.

It is agreed by all who have visited the club that the rooms are exceedingly attractive, and nothing but commendation is expressed for the manner in which the club is conducted. It is evident that there will be no difficulty in securing as many members as can be accommodated. The most recent accessions are the following:

### New Members.

CHARLES J. BILLSON,  
*Tribune* Building, New York.  
MOSES M. BROADWELL,  
44 Broadway, New York.  
CHARLES E. BROWN,  
Bridgeport, Conn.  
HAROLD C. BULLARD,  
Potter Building, New York.  
CHARLES L. CAMPBELL,  
Peck, Stow & Wilcox Company,  
Southington, Conn.  
EDWARD S. CLINCH,  
115 Broadway, New York.  
SAMUEL COLES,  
280 Broadway, New York.  
WILLIAM F. DONOVAN,  
Yale & Towne Mfg. Company,  
Stamford, Conn.  
JAMES A. DOUGHTY,  
Torrington, Conn.  
ANTHONY R. DYETT,  
247 Broadway, New York.  
WILLIAM P. FERGUSON,  
Forcite Powder Company,  
New York.  
WILLIAM R. GALT,  
253 Broadway, New York.  
G. H. HAULENBEEK,  
*Times* Building, New York.  
EDWIN HAVILAND,  
45 Barclay street, New York.  
ANDREW H. HOGG,  
National Brass & Iron Works,  
New York.  
RICHARD M. LAIMBEER,  
253 Broadway, New York.  
RANSOM LAMB,  
Smith, Lyon & Field,  
New York.  
THOMAS F. LANE,  
Summit, N. J.  
H. P. LEONARD,  
76 and 78 Reade street, New York.

JAMES T. LOW,  
253 Broadway, New York.  
L. K. MCCLYMONDS,  
New York Belting & Packing  
Company, New York.  
CHARLES McMULLEN,  
Scranton, Pa.  
C. G. MAGEE,  
18 Murray street, New York.  
O. C. MEAD,  
Millers Falls Company, New York.  
THOMAS E. OLIVER,  
118 Chambers street, New York.  
CARL OTTO PETERS,  
24 Beaver street, New York.  
J. B. ROACHE,  
Brooklyn Hardware & Sporting  
Goods Company, Brooklyn.  
JOHN C. SCHRADER,  
245 Broadway, New York.  
CHARLES D. SIMONSEN,  
261 Broadway, New York.  
CHAS. J. STEBBINS,  
103 Reade street, New York.  
G. PERCIVAL STEWART,  
Manchester, N. H.  
FREDERICK TOPPING,  
92 Chambers street, New York.  
A. G. WALTON,  
Mechanical Rubber Company,  
New York.  
EDWIN WARDMAN,  
Editor *Tribune*, New York.  
T. W. WEEKS,  
253 Broadway, New York.  
H. WERLEMANN,  
97 Reade street, New York.  
LOUIS WERTHEIMBER,  
39 Barclay street, New York.  
HENRY WITTE,  
Bawo & Dotter, New York.

### Visitors.

Judged by the large number of visitors already registered at the Hardware Club as a headquarters for the Hardware, metal and allied trades, this will evidently be in future the meeting place of merchants and manufacturers when in the city. It is the desire of the club officials that this should be generally understood, and that as individuals or trade associations from the various parts of the United States or abroad, when visiting this city use should be made of the club as a trade rendezvous, as provided for in the house rules. There are ample facilities for conferences, meetings, &c., on business matters, where the utmost privacy can be had, and at the hours for lunch or dinner visitors are almost sure of meeting persons with whom they do business or some of their representatives. During the recent hot and sultry weather one of the best known members said, while descending the elevator after dinner, he had forgotten it was hot weather, owing to the delightful breeze and excellent ventilation, freedom from noise, dust, &c. We give below a portion of the names of gentlemen from outside the city who visited the club:

John S. Chandlee, H. B. Chandlee,  
Sons & Co., Baltimore, Md.  
Wilson D. Lyon, Cape Town, South  
Africa.  
A. S. Upson, Cleveland, Ohio.  
W. L. Ogden, Warwick, N. Y.  
A. Clement, Paris, France.  
P. Nassay, Paris, France.  
J. A. Ogden, Ogden & Pelter, War-  
wick, N. Y.  
James Motley, T. N. Motley & Co.,  
Milwaukee, Wis.  
William F. Donovan, Stamford,  
Conn.  
E. W. Fitch, Norwalk Lock Com-  
pany, Norwalk, Conn.

W. T. McPherson, Sydney, Aus-  
tralia.  
H. Hoffman, Jr., Norwalk Lock  
Company, South Norwalk, Conn.  
Charles E. Brown, Bridgeport Copper  
Company, Bridgeport, Conn.  
C. H. Tucker, Bound Brook, N. J.  
A. F. Moore, Philadelphia, Pa.  
H. S. Lockwood, Lockwood Mfg.  
Company, South Norwalk, Conn.  
James H. Doughty, Coe Brass Com-  
pany, Torrington, Conn.  
J. A. Wheeler, Oswego Indurated  
Fiber Company, Oswego, N. Y.  
J. G. Lane, Lane Bros., Poughkeep-  
sie, N. Y.  
J. W. Kiser, Monarch Cycle Com-  
pany, Chicago, Ill.  
T. A. Farnsworth, P. & F. Corbin,  
Camden, N. Y.  
George A. Abbott, P. & F. Corbin,  
Camden, N. Y.  
A. J. Bassett, Grand Crossing Tack  
Company, Chicago, Ill.  
F. L. Cowles, C. Cowles & Co., New  
Haven, Conn.  
James D. Green, Supplee Hardware  
Company, Philadelphia, Pa.  
C. W. Galt, John Galt & Sons, Chi-  
cago, Ill.  
Hon. J. B. Sargent, Sargent & Co.,  
New Haven, Conn.  
G. L. Sargent, Sargent & Co., New  
Haven, Conn.  
J. D. Dezendorf, Hibbard, Spencer,  
Bartlett & Co., Chicago, Ill.  
A. A. Starring, Silver Creek Step  
Ladder Company, Silver Creek,  
N. Y.  
Nelson M. Beach, Jr., Bridgeport  
Brass Company, Bridgeport, Conn.  
W. C. Magee, H. C. Frick Coke Com-  
pany, Pittsburgh, Pa.  
C. H. Turner, Albany Hardware &  
Iron Company, Albany, N. Y.  
G. W. Kinney, Kinney & Levan,  
Cleveland, Ohio.  
A. P. Baldwin, Kinney & Levan,  
Cleveland, Ohio.  
Samuel A. Haines, Indianapolis, Ind.  
E. Warren Smith, Pike Mfg. Com-  
pany, Chicago, Ill.  
Charles L. Campbell, Peck, Stow &  
Wilcox Company, Southington,  
Conn.  
John W. Hubbard, Hubbard & Co.,  
Pittsburgh, Pa.  
A. W. Chaffee, Markham Air Rifle  
Company, Plymouth, Mich.  
W. H. Gaines, Rogers & Hamilton  
Company, Waterbury, Conn.  
A. P. Swoyer, Bridgeport Brass  
Company, Bridgeport, Conn.  
Charles McMullen, Lackawanna  
Hardware Company, Scranton, Pa.  
Frank Lane, H. L. Judd & Co.,  
Wallingford, Conn.  
C. S. Upton, Rochester Lamp Com-  
pany.  
George E. Voorhees, Morristown,  
N. J.  
O. C. Mead, Millers Falls Company,  
Detroit, Mich.  
J. W. Gates, Consolidated Steel &  
Wire Company, Chicago, Ill.  
George T. Oliver, Oliver & Roberts  
Wire Company, Pittsburgh, Pa.  
Charles F. Brooker, Coe Brass Com-  
pany, Torrington, Conn.  
John H. Comer, New Haven Copper  
Company, New Haven, Conn.  
C. E. Hill, Bridgeport Chain Com-  
pany, Bridgeport, Conn.  
F. B. Furbish, Ingalsbee & Furbish,  
Mexico City, Mexico.  
A. M. Marshall, Marshall-Wells  
Hardware Company, Duluth,  
Minn.  
George Redman, Rochester Gas &  
Electrical Co., Rochester, N. Y.  
F. Matthiessen, Manufacturers' Sup-  
ply Co., Chicago, Ill.  
George P. Hart, Stanley Works, New  
Britain, Conn.  
George S. Drake, St. Louis, Mo.  
D. L. Durand, Birmingham Brass  
Company, Birmingham, Conn.  
B. L. Coe, Steele & Johnson Chain  
Company, Waterbury, Conn.



C. E. Bishop, Steele & Johnson Chain Company, Waterbury, Conn.  
Joseph L. Jennings, C. E. Jennings & Co., New Haven, Conn.  
A. O. Jennings, Waterbury Watch Company, Waterbury, Conn.  
John O'Flaherty, St. John's, Newfoundland.  
W. W. Gauche, R. J. Allen, Son & Co., Philadelphia, Pa.  
W. S. Harris, Trenton, N. J.  
H. L. Judd, H. L. Judd & Co., Wallingford, Conn.  
M. L. Farrell, Tabb & Jenkins Hardware Company, Baltimore, Md.

This is, however, but a partial list, and the names of many well-known merchants and manufacturers from out of town are omitted, as are also those of many persons doing business in this city who are not as yet actively identified with the club.

## New England Hardware Dealers' Association.

**B**Y FAR the most successful meeting up to date of the New England Hardware Dealers' Association was held at the United States Hotel, Boston, on Wednesday, June 13. Invitations had been sent to a number of Hardwaremen not yet in the association and the attendance reached the high water mark of 150. Of these about one-half were guests. The arrangements were perfect, and promptly at 7 o'clock the party filed into the large banquet hall and sat down to a feast of good things. The only regrettable circumstance was the absence of the president, Samuel H. Thompson, who was prevented from taking his place at the head of the table by illness. His place was acceptably filled at short notice by N. P. Hayes of New Bedford, and the position of toast master was gracefully taken by Hiram G. Janvrin, chairman of the Entertainment Committee. At the close of the feast of material things, the intellectual treat prepared was inaugurated.

The enthusiasm of the company and the evident enjoyment of the numerous guests promises a new era of prosperity for the association, and a large accession to the membership is likely to be the result of the June dinner. The special guests of the association were: Lieutenant-Governor Wolcott, M. J. Woodruff of New York, president of the Russell & Erwin Mfg. Company; Charles E. Adams of Lowell, president of the Massachusetts State Board of Trade; Charles Clark Adams of Boston, representing Sargent & Co. of New Haven, Conn.; Rev. G. W. Mansfield of Charlestown, Rev. Chas. G. Ames of Boston, H. H. Waite, George W. Herrick, G. E. Strauss, William Q. Wales, J. R. Simpson, Jr., and H. L. Doten.

The first address was delivered by Lieut.-Gov. Roger Wolcott, who spoke of the inventive genius of the Hardware manufacturer and the fascination the Hardware store had for him, ranking the small boy's love for a jackknife as superior to his fondness for the jam closet. He commended associations of business men generally and the New England Hardware Dealers'

Association particularly, dwelling upon the benefits of co-operation and its tendency to increase the standard of business morality and stimulate activity in friendly competition. The Lieutenant-Governor offered the greetings of the Commonwealth, and said: "While these are not prosperous times, the men of Massachusetts have not been accustomed to lie down in the face of adversity, and will speedily rise superior to present trying conditions."

E. J. Neale then read the following address, which had been prepared by Samuel H. Thompson, the president of the association:

### The President's Address.

It is indeed a pleasure to me to greet so many fellow Hardwaremen, and a greater pleasure to extend to our guests in behalf of our association a most cordial welcome. We have desired to see all New England within our walls, and since the founding of this organization, a little over one year ago, it has increased from 25 to 105 and is still extending itself, so that our desires are being, in a measure, met. We have also set a good example, as Massachusetts generally does, to the whole country, for we have now reports from the West and South that they have also started similar organizations.

#### HARDWARE FOR THE ARK.

I have often wondered where the name "Hardware" originated, but it was so far back in antiquity that to attempt to find it would be like starting to discover the north pole; but we know that it has existed since the world began to move—in fact we feel that the Hardwaremen had an important part in getting this planet into motion. We were told, not many months ago, by a prominent Hardwareman, that when Noah built his ark he depended upon the Hardwareman for his supplies, and we feel sure that he was equal to the occasion, and had anticipated the wants even of so great an undertaking, for we know that if the Hardwareman took any stock in Noah's operations he let him have the goods, feeling that if rumors were true his Hardware would be safer in the hand of Noah than in his store.

#### HARDWARE FIRST.

Wherever civilization existed there was found the Hardwareman. He was, and is, and always will be as indispensable as sunlight, and the four necessary institutions with which to start a town are the church, school, Hardwareman and groceryman, and, as a rule, wherever a town is started the Hardwareman, with great breadth of mind, gathers all trades in Christendom under his one sign, "Hardware, Groceries, Dry Goods, Paints, Oils," &c., but Hardware is always first on the list, and I suppose to give dignity to the other trades.

#### THE TEMPLE HARDWARE.

That the Hardwareman of old was looked upon with reverence is attested by history. After the most beautiful temple that the world has any record of was finished, King Solomon issued an order that all who had any part in the erecting of it should be brought before him and give an account of the part they took in its construction. You will remember that Hiram of Tyre, that famous Lock and Knob manufacturer who made all the beautiful and exquisitely designed Hinges and trimmings of gold and brass and copper, came and told of his part in the work and of the beautiful Hardware he furnished, all of his own make

and design, and Solomon made obeisance unto him. Then came Ahinadab and told of his part in the carving of the cedar and kindred woods, but he said he could have accomplished nothing had it not been for the superior Tools furnished by the prominent Hardwareman of the place. Then came Geber, a hewer of stone and marble, and he modestly praised the man from whom he got his Tools. Then Baana, the carver in ivory and worker of precious stones, and he said: "Not a thing could I have done but for the skilled Hardwareman who made all my Tools." Then the king said: "I have heard enough, for there is none so great as this Hardwareman; bring him before me." Modestly he came, as the Hardwareman generally does, and King Solomon asked him if all he had heard was true. He quietly consented to all that was said, and Solomon put a crown upon his head and sat him on the throne. Now I know you'll all admit this to be a pretty story, but it's a true one, and only shows the estimation in which the Hardwareman was held in the early ages.

#### DIGNITY OF BUSINESS.

As there have been epochs in the world's history, so there have been epochs in trade's history. Men are learning to-day that the one thing necessary to weave into the fabric of success is confidence in fellow men, and as soon as men learn to treat each other honestly, business will assume the dignity and the title it deserves, and will be a pleasure and not the burden that men make it oftentimes. Solomon said: "Seest thou a man diligent in business, he shall stand before kings; he shall not stand before mean men." I think there is too much of the molusk in the life of the ordinary Hardwareman, not so much by nature, but by close application to the ordinary duties of his business; for where in this great country can be found a business of such infinite detail? A man, to be a good Hardwareman, must know his goods and their use, and all this is taxing.

#### COMPETITORS AS ENEMIES.

We have yet to learn great lessons from the Orientals in business, for with them competitors are friends, but too often to-day with us competitors are enemies. The strife for the mighty dollar leads the American business man to assume that he alone of all others has sole right to enter business, while all others are trespassing upon forbidden ground. History repeats itself, and with the Hardwaremen, as with all others, success sits upon the man who is peculiarly fitted for the business. The old adage that "envy begets strife" is never better illustrated than in trade. The most bitter feuds are those that exist between tradesmen, and they grow more bitter as a man allows his imagination to become distorted and his mind narrowed by petty jealousies, and as competition becomes sharper, hatred increases until it becomes blind to all reason and loses self control. Business to such men becomes a burden. How to avoid such a condition is

#### "THE NEW THOUGHT."

and out of this have grown desires which have formed "a new epoch in the trade's history." These desires have taken place in the shape of organizations, where men can meet on a common ground and discuss freely, and without fear, any question pertaining to the welfare of their business. They meet "that old sinner competitor" of theirs, and for a minute their blood boils, and then they think: "Well, I'll shake hands with him this time, although I hate to do it." But they



do and thence is broken, and each finds the other "sinner" quite a good fellow after all; and ten to one if the next morning they don't meet and say: "What's the use of selling Nails for \$1.50, when they cost \$1.45? Let's act sensible," and before long they do.

Let me read you the preamble of this organization, and see if it don't sound good:

The New England Hardware Dealers' Association is intended to include in its membership all responsible Hardware dealers, both wholesale and retail, throughout the New England States.

The trade have long recognized the necessity of an organization and the need of closer social and business relations, realizing that much unjust competition arises from misunderstandings and imaginations therefrom; also having for its object the protection of honest dealers, and guarding them against fraud. These are the principles of this association.

It is not intended to encourage any schemes of individuals or firms, but to consider and act upon all matters pertaining to the general welfare of the trade.

You are respectfully invited to examine the constitution and by-laws on the succeeding pages of this pamphlet.

Now I'd like to be Methodist enough to-night to start a genuine revival among Hardwaremen and say: If there's any man here who has not been just the kind of a "sinner" that I've spoken of, let him depart out from this organization, for we are not good enough for him to associate with; but all those who need the saving grace of just such an organization as this, and feel that they have sinned enough to join it, stand up. I won't ask you to confess, right here before this audience; but we are going to have a little after meeting, and Treasurer Barber will be in charge, and he will answer all questions, and I know, if you will only listen to him, you'll be saved.

I am glad to greet you all, and I trust to see you all within our organization.

At the close of President Thompson's address, A. S. Morss offered the following resolution of sympathy and regret, which was adopted unanimously:

The New England Hardware Dealers' Association at dinner assembled June 13, 1894, send greeting to President Samuel H. Thompson and an expression of their sincere regret for his absence through illness. The members of the association desire to thank him for the able and interesting paper read to them by E. J. Neale and hope and pray for his speedy recovery and early return to the activity of business and social life.

Mr. Janvrin then introduced M. J. Woodruff, president of the Russell & Erwin Mfg. Company, who spoke as follows:

#### Mr. Woodruff's Address.

I have thus far in life been best known by acts performed rather than by talk. I am here to-night in the two-fold capacity of manufacturer and dealer in Hardware, but as you are nearly all dealers I shall mainly talk from the standpoint of a manufacturer, although the two industries are so closely interdependent the one upon the other that a clear dividing line is hardly apparent.

It is the first duty of an established manufacturer to ascertain what goods the trade requires, and, as well as may be done prospectively, the required season's quantities of the various kinds and styles. To ascertain these facts he must have information from those in the market, the dealers, and in turn the dealer has opportunity to impress his ideas and wants upon the manufacturer. In the manufacture of every line of goods manufacturers find among themselves

#### COMPETITION

in quality, fitness, style and price, and in these later years some competition in costs. While competition in all business is essential to its best results in the broadest sense, it need not and should not become personally antagonistic between parties. There is abundant field for improving our own without damaging our neighbor.

Competition among manufacturers sharpens ideas, promotes the study of trade needs, excites the genius of invention, improves the product of labor through better adaptation or easier adjustments to its multifarious uses; and whether these are applied to power, machinery, or their products, there is a constant tendency toward reducing the severity of human labor, toward lightening its burdens, while its efficiency is increased in producing an improved quality of goods and at lower prices.

The application of steam and electricity as power, the new methods of mining and smelting ores, of converting iron into steel, new adaptations of machinery, immeasurably increase the efficiency of human effort by multiplying its power of performance, while the rewards of labor have been substantially enhanced.

Growing out of these a higher, better

#### • PLANE OF LIVING

has been established and supported, for all the people, whatever be their station—all are benefited through the initiative of business competition, acting upon the inventive brain, the mechanic's skill, and the business abilities which assemble and direct these forces.

But while the heavier physical burdens of human labor are lessened, there is none the less necessity for live, energetic, persistent labor in every avenue of industry, in order that continuing good shall come, not to one particular industry, but to all men. There is no place where idleness and prosperity go hand in hand. There has been no more beneficent edict to man in this world as it is than "By the sweat of thy brow shalt thou earn thy bread." To young men I would say, whether you labor with your hands or your heads, labor with your whole hearts and wait patiently for the results.

To a large extent in this country, as well as abroad,

#### MANUFACTURING

in its various branches, and in the West particularly merchandising as well, are being carried on under organized incorporated capital companies, often aggregated of two or more competing businesses previously conducted by individuals or partnerships. These are controlled by duly selected officers and managers. The old saying that "Corporations have no souls" in the sense that they are unjust, unscrupulous or disregarding of others, is as untrue to-day as it always has been. The personal integrity and good faith of its managers are the life spring and soul of the corporation, and these are in no degree weakened because exercised in a fiduciary capacity.

Here before me is the best possible exemplification of the amenities of trade—of the fact that

#### COMPETITION,

however keen and persistent, need not be personally harmful. You are gathered from different parts of New England, every man a competitor of every other man, to sit down together around the festive board for mutual counsel and enjoyment, the only strivings being directed toward means for bettering the condition of all.

It is a happy condition that you have a business wherein so many able New England men find ample scope for their abilities and tastes; that you have an organization through which individual members can so readily take counsel with neighboring competitors and friends; that it so well provides for the formation of personal and business acquaintanceship and for the interchange of personal greetings and friendly regards, all tending toward the cultivation of the amenities of business.

#### Address by Charles E. Adams.

The third speaker was Charles E. Adams of Lowell, President of the Massachusetts Board of Trade. Mr. Adams said that the retail Hardware dealer and the retail Hardware business had been touched upon by his predecessors and the ground gone over so thoroughly that he would speak more particularly of business organizations with which, as is well known, he is prominently identified. Beginning, he told the story of two Methodist ministers, one of whom was in the habit of preparing his sermons beforehand, while the other spoke impromptu. The latter in holding up his end of the argument said the prepared sermon being made up in advance was subject to influences calculated to counteract any good effect it might have, while as for himself, going into the pulpit unprepared, the adversary had no chance to cook up counteracting arguments, for he said, "The devil himself does not know what I am going to say." Mr. Adams then continued and spoke eloquently; setting forth the value of business organizations and their influence in securing legislation favorable to the business world; urged the sending of business men to Congress and glorified the merchant in politics. Continuing, and speaking directly to this organization, he advised the members to co-operate heartily with the officers, and that all business organizations should join together, stating that the Massachusetts State Board of Trade already includes 38 business associations within the State, and this concentration of influence was rapidly developing a power in public matters affecting the trade. Mr. Adams predicted that within five years a National Chamber of Commerce, composed of State Boards of Trade, would be formed that would have power to relegate to the background 7 x 9 politicians, and put in control business men that would run this country better than it had been run in the past. The tariff was lightly touched upon by this speaker, and the honorable Senator who in Washington a few weeks ago objected to a change in tariff on Wood Screws because the lumber schedule had already been considered was held up to ridicule.

The last address was delivered by Charles Clark Adams of Sargent & Co., whose reputation as a humorist made the company disinclined to take him seriously. After telling a few funny stories in his inimitable way, Mr. Adams read the following paper,

which was listened to very attentively, although at first it was evident that every one was looking for a joke to pop up at any moment.

### Ancient Locks and Fastenings.

It is fair to assume that thieving has been practiced since the world began and has continued to the present moment, therefore the use of Locks and fastenings has been necessary to protect valuables and secure dwellings and apartments from intrusion. In looking up information upon this subject, I find few publications of much value, but such as I have found have been to me of great interest. In the British encyclopedias I have found descriptions of old Locks such as we to-day know little about.

#### HISTORICAL LOCKS.

The antiquity of Locks and Keys is unquestioned. We read in Holy Writ of their use many centuries prior to the Christian Era. In Solomon's Song, chapter v, verse 5, we read, "I rose up to open to my beloved, and my hands dropped with myrrh, and my fingers with sweet smelling myrrh, upon the handles of the lock." In Nehemiah, chapter iii, verse 3, is the following: "But the fish gate did the sons of Hassenaah build, who also laid the beams thereof, set up the doors thereof, the locks thereof." And these words are repeated in the 6th, 13th, 14th and 15th verses. You will observe in the foregoing quotations there is no mention of a Key in connection with the Lock.

#### LOCKS WITH KEYS.

In Judges, chapter iii, verses 23-25, we read, "Ehud went forth through the porch, and shut the doors of the parlor upon him, and locked them. When he was gone out his servants came, and when they saw that behold the doors of the parlor were locked they said, surely he covereth his feet in his summer chamber, and they tarried till they were ashamed, and behold he opened not the doors of the parlor, therefore they took a key and opened them." In Jeremiah, xxiv, verse 1, we read that Nebuchadnezzar, King of Babylon, carried off captives "carpenters and smiths" from Jerusalem to Babylon.

#### LARGE KEYS.

The most ancient Lock ever discovered is described by Mr. Bonomi of England as having secured the gate of an apartment in one of the palaces of Khorsabad. He says: "At the end of the chamber just behind the first halls was formerly a strong gate of one leaf, which was fastened by a large wooden Lock, like those still used in the East, of which the Key is as much as a man can conveniently carry, and by a bar which moved into a square hole in the wall. It is to a Key of this description that the prophet probably alludes, 'And the key of the house of David will I lay on his shoulder,' and it is also remarkable that the word for Key in this passage of Scripture, Isaiah, xxii, 22, is the same in use all over the East at the present time—'Muftah.' The Key of an ordinary street door is commonly 18 or 14 inches long, and the Key of the gate of a public building or of a street or quarter of a town is 2 feet and more in length." This reminds us that at the present day the Yale Lock Company furnish Keys of a similar length to be used as sign-boards.

#### PIN LOCKS.

The ancients used to hang their Keys over their shoulder several at a time, suspended by strings and sometimes by chains. At one end of their Keys were iron pegs to correspond to so many holes in the wooden bar or

bolt of the Lock. When the door or gate is shut it cannot be opened until the Key has been inserted and the impediment to the drawing back of the bolt removed by raising up so many iron pins that fall down into holes in the bar or bolt corresponding to the peg in the Key. The above discovery, and also the figure of one being sculptured among the *basso relievos* of the great temple of Karnac, prove it to have been in use in Egypt for about 4000 years, during which period it does not appear to have undergone any sensible change. This discovery was first published in England in 1798, but was not generally known until the invasion of Egypt by Napoleon early in the present century, when a further account of it was given by M. Denon in his great work on that country. It is also remarkable that this same Pin Lock was found to have been in use for centuries in the Faroe Islands, being identical in its construction with the Egyptian, all their parts, Lock and Key, being made of wood. A Lock similar in character has been in use in Cornwall from time immemorial, which might have been introduced there by the Phenicians.

Mr. Chubb of London, in his paper on the construction of Locks and Keys, April 9, 1850, says:

#### CROOKED KEYS.

"It is evident, however, that in the East another Lock and Key of a different description was in ordinary use for fastening large doors and gates. There is nothing recorded as to the construction of the Lock, but it can be inferred from the description given of the Key, which is stated to have been in the form of a large Sickle." Aratus, in order to give his readers an idea of the form of the constellation Cassiopeia, compares it to a Key, and Huetius states that the constellation answers to such a description, the stars to the north composing the curved part and those of the south the handle. In Parkhurst's Hebrew Lexicon we read: "In early ages they made use of certain crooked Keys having an ivory or wooden handle." These Keys were placed in the holes of doors, and by turning them one way or the other the bolt was moved forward or backward in order to open or shut the door. Homer in his "Odyssey" XXI, writes of Penelope, wanting to open a wardrobe, using a brass Key, very crooked, hafted with ivory. Eustathius, who flourished in Constantinople about 1170, speaks of this Key as very ancient, which differs from the Keys having several wards which have been invented since. Callimachus, in his hymn to Ceres, speaks of her priestess Nicippe carrying a Key. Mr. Donaldson of London, writing about ancient doorways, says, "The fastenings to the doors consisted of Bolts, Bars and Locks." Commentators are uncertain as to the time when Keys were first used. Eustathius attributes the invention to the Lacedemonians. Pliny, on the other hand, gives the credit of the discovery to a certain Theodorus of Samos.

#### KNOTTED CORDS AS LOCKS.

At all events, the use does not appear to be as remote as the Homeric ages, for in the "Odyssey" Ulysses is represented as securing the rich and costly robes, vases, gold and other valuable presents of Alcinoüs and his queen, by a rope or cord fastened in a knot. This knot of Ulysses became a proverb to express any insolvable difficulty, and the proof of the esteem in which the ancients held this art, so necessary in the absence of Locks, may be adduced from the Gordian knot famous in antiquity. In fact, Homer describes the treasures and other valuable objects as being kept in the citadel, secured merely by a cord intricately knotted.

This, of course, was soon found to be a very poor protection; therefore a wooden bar was adopted inside the doors of houses, to which it was attached by an iron Latch, fastened or removed by a Key adapted to it. This Key was easily applied from within, but in order to get at it from without a large hole was made in the door allowing the introduction of the hand so as to reach the Latch and use the Key.

#### GROWTH OF THE LOCK.

The Lock called the Lacedemonian, much celebrated by ancient writers, was invented subsequently; it was especially fitted for the inner chambers of houses, the bar fastenings continuing to be employed for closing the outer doors of dwellings and the entrance gates of cities. The Lacedemonian Lock did not require a hole to be made in the door, for it consisted of a bolt placed on that side of the entrance door which opened, and on the inside of a chamber door. When a person outside wished to enter, it was necessary for him to insert the Key in a little hole and raise the bolt, and in time this species of fastening was improved by the insertion of the bolt in an iron frame or rim permanently attached to the door by a chain, and fastening the door by the insertion of the hasp, through the eye of which was forced the bolt inside the Lock by applying the Key. Thus it appears that the Locks of the ancients were not of the same construction as ours, not being inserted or mortised into the doors; not even attached, except by chain, being, in fact, mere Padlocks.

#### KEYS WITH WARDS.

Throughout old writings one reads of doors being fastened by the use of bolts and bars. In "Ben Hur," we read of his house in Jerusalem being closed by valves. Doubtless General Wallace, the talented writer, found many of these ancient usages during his residence and travels in the Orient and the Holy Land. One also reads of progression in the art until Keys were worn upon the fingers by aid of a ring, and Keys having many wards. The pictures of these old Keys, with large rings to wear on the finger, are very curious and interesting.

#### KEYS OF POMPEII.

In the year 1689, during some excavations in the plain at the foot of Vesuvius, where it was subsequently proved that Pompeii had flourished, a workman observed the regularity with which successive layers of earth and volcanic matter had been deposited, and compared them to pavements one upon the other, with remains of burnt vegetation, charcoal and common earth beneath each volcanic deposit. Under one of these dense masses of scoria, dust and pumice stone he found large quantities of carbonized timber, Locks and iron work, evidently the remains of the inhabitants, which together with some old Keys and inscriptions giving the name of the locality, satisfied the learned of the day that they belonged to the ancient city of Pompeii. In the garden was found a skeleton with a Key in its bony hand, and near it a bag of coins. This is believed to have been the master of the house, who probably thought to escape by the garden, and had been destroyed either by vapors or some fragment of stone. Beside some silver vases lay another skeleton, probably of a slave. Examples of beautiful Roman Keys found in various parts of England and now deposited in the British Museum fully bear out this statement. There are also very beautiful specimens of early English Keys in the museum at Marlborough House that are the wonder and interest of all admirers of this art.

## ANOTHER CURIOUS ITEM

of Lock making is that between the Keys found at Pompeii and Roman Keys found in England there is a distinctive difference, although all of them belong to the same description of Lock—that is, a warded Lock, and the shape of the cuts and holes in the bits of these ancient Keys proves beyond question that the Keys did not perform a complete revolution, but were identical with the spring Locks and Latches of modern days.

## PERFECTION OF LOCKSMITHING.

It was in the sixteenth century, in Germany, Italy, France and England that the art of locksmithing was at its highest perfection, and the Keys, too, were very beautiful. In Europe the visitor will find in many of the museums and art collections most valuable collections of Keys, the bows of which are as beautiful as finest lace-work, and examples of such Keys are considered exceedingly valuable by art collectors. Upon the bows were worked insignias, coats of arms, noble escutcheons, fine piercings and ornamentations, these all being placed at the end grasped by the hand and for which we to-day substitute a plain bow or ring. I am told the wards of some Keys of the Elizabethan reign were as thin as tissue paper, and, of course, must have been made of a superior quality of iron. These ancient Keys were made of iron, bronze, copper, brass, silver and gold, the two latter precious metals being, of course, only seldom used except by the nobility.

## New Members.

Previous to the banquet a business meeting was held, at which the following new members were elected:

CHARLES H. BOLLES of Bolles & Wilde, Boston, Mass.  
ALFRED L. LINCOLN of New Process Twist Drill Company, Taunton, Mass.  
ARTHUR C. LAMSON of Lamson & Trowbridge, Marlboro, Mass.  
JOHN M. FISK of Fisk & Co., Natick, Mass.  
F. L. ELLIS of Clark Ellis & Sons, Milford, Mass.  
Other matters were laid over until the next meeting, in September. Below is a full list of those in attendance:  
N. P. Hayes, New Bedford, Mass.  
Roger Wolcott, Boston, Mass.  
M. J. Woodruff, New York, N. Y.  
Charles E. Adams, Lowell, Mass.  
H. G. Janvrin, Boston, Mass.  
Charles C. Adams, Boston, Mass.  
E. J. Neale, Lowell, Mass.  
Rev. George W. Mansfield, Charlestown, Mass.  
F. O. Barber, Newton, Mass.  
Frank Jones, Newton, Mass.  
F. G. Lillyman, Boston, Mass.  
A. S. Morss, Boston, Mass.  
C. E. Chamberlin, Roxbury, Mass.  
A. D. Gill, Roxbury, Mass.  
George J. Mulhall, Boston, Mass.  
Frank C. Spear, Boston, Mass.  
Rev. Charles Gordon Ames, Boston, Mass.  
James A. Farless, Boston, Mass.  
D. Fletcher Barber, Boston, Mass.  
Edward T. Bynner, Boston, Mass.  
G. W. Burditt, Boston, Mass.  
John M. Fiske, Natick, Mass.  
W. D. Parlin, Natick, Mass.  
J. V. Twomey, Boston, Mass.  
J. Pennell, East Cambridge, Mass.  
J. Edwin Price, East Cambridge, Mass.  
F. A. White, East Cambridge, Mass.  
W. S. Burditt, East Cambridge, Mass.  
W. Irving Heald, West Somerville, Mass.  
N. A. Carter, Boston, Mass.  
P. C. Weeks, Everett, Mass.  
O. M. Gove, Waltham, Mass.  
J. F. Willett, Waverly, Mass.

F. G. Mayo, Jamaica Plain, Mass.  
C. H. Nichols, Jamaica Plain, Mass.  
R. W. James, Jamaica Plain, Mass.  
F. A. Fraser, Jamaica Plain, Mass.  
T. F. Duffy, Jamaica Plain, Mass.  
L. R. Small, Roxbury, Mass.  
J. P. Mackey, Brookline, Mass.  
C. D. McDowell, Brookline, Mass.  
F. E. Putnam, Peabody, Mass.  
W. E. Plumer, Somerville, Mass.  
W. E. Whitney, Somerville, Mass.  
G. W. Snow, Somerville, Mass.  
H. J. Perry, Melrose, Mass.  
J. H. Sayward, Haverhill, Mass.  
Wm. Chamberlin, Dorchester, Mass.  
H. C. Dodge, Boston, Mass.  
M. B. Stebbins, Boston, Mass.  
C. O. Tukey, Chelsea, Mass.  
Charles A. Green, Boston, Mass.  
Alfred L. Lovejoy, Boston, Mass.  
Alfred L. Lincoln, Taunton, Mass.  
Bion C. Pierce, Taunton, Mass.  
Lyman Mason, Taunton, Mass.  
A. Winnek, Boston, Mass.  
John C. Holden, Hudson, Mass.  
A. Gilman Ferdinand, Boston, Mass.  
Austin Whitcomb, Beverly, Mass.  
Frank Chandler, Boston, Mass.  
Charles S. Farquhar, Boston, Mass.  
J. C. Nichols, South Boston, Mass.  
F. A. Flanders, South Boston, Mass.  
C. M. Nichols, Dorchester, Mass.  
Frederick W. Kidd, Lawrence, Mass.  
N. L. Move, Lawrence, Mass.  
W. S. Mitchell, Lawrence, Mass.  
L. B. Brook, Boston, Mass.  
H. W. Raymond, Gloucester, Mass.  
E. P. Flanders, Lawrence, Mass.  
George A. Libby, Lawrence, Mass.  
John H. Clark, Nashua, N. H.  
E. H. Mansfield, Boston, Mass.  
John H. Robbins, Boston, Mass.  
W. Howard Hutchinson, Lynn, Mass.  
Wm. P. Butler, New Bedford, Mass.  
J. C. Cobban, Groveland, Mass.  
G. W. Darling, Charlestown, Mass.  
E. E. Fish, Boston, Mass.  
A. M. Robbins, Cambridgeport, Mass.  
E. F. Bliss, Jamaica Plain, Mass.  
J. E. Morton, Jamaica Plain, Mass.  
S. D. Balkam, Jamaica Plain, Mass.  
Henry C. Ordway, Boston, Mass.  
A. H. Ricker, Boston, Mass.  
A. Corbett, Boston, Mass.  
Elmer C. Rice, Boston, Mass.  
F. R. Washburn, Taunton, Mass.  
J. H. Williams, Boston, Mass.  
S. W. Thompson, Woburn, Mass.  
H. M. Sanders, Boston, Mass.  
James A. Cook, South Boston, Mass.  
John T. Disney, South Boston, Mass.  
H. H. Hale, South Boston, Mass.  
William M. Russell, Waltham, Mass.  
Charles C. Swett, Melrose, Mass.  
S. M. Scribner, Melrose, Mass.  
Geo. W. Whittmore, Melrose, Mass.  
William A. Burrell, Melrose, Mass.  
W. W. Hall, Melrose, Mass.  
M. R. Coombs, Melrose, Mass.  
E. C. W. Bliss, Boston, Mass.  
John J. Douglas, Boston, Mass.  
Steward McNeill, Boston, Mass.  
J. A. Durell, Somerville, Mass.  
G. W. Barnes, North Cambridge, Mass.  
E. H. Aldrich, Fall River, Mass.  
J. S. Monson, Salem, Mass.  
M. E. Austin, Lawrence, Mass.  
L. Lawrence, Lexington, Mass.  
J. T. Power, Boston, Mass.  
A. A. Percival, Waltham, Mass.  
R. L. Van Buskuk, Allston, Mass.  
John T. Cushman, Newton, Mass.  
A. S. Christopher, Newton, Mass.  
J. B. Hunter, Boston, Mass.  
J. H. Willon, Boston, Mass.  
J. M. McGlinchey, Olmville, Mass.  
A. A. Lummis, Providence, R. I.  
E. A. Lummis, Providence, R. I.  
L. H. Tourtellotte, Boston, Mass.  
M. A. Chandler, Boston, Mass.  
J. L. Worns, Boston, Mass.  
W. H. Warren, Boston, Mass.  
Walter J. Young, Boston, Mass.  
W. E. Brown, Boston, Mass.  
Chas. L. Rogers, Lowell, Mass.  
T. H. Baldwin, Boston, Mass.  
Leon C. Carter, Boston, Mass.  
Samuel A. Bigelow, Boston, Mass.  
Charles H. Bolles, Boston, Mass.

## The Richmond Meeting. Southern Hardware Jobbers' Association.

THE SOUTHERN JOBBERS, after their very successful convention at Richmond, separated with expressions of satisfaction and mutual congratulation on the fraternal spirit evinced and the good work done. The disposition of manufacturers to co-operate with them as far as feasible was referred to as promising more harmony in the future than has characterized the trade the last few years. It was also recognized that a great deal rests with the jobbers themselves, as if they can pull together, avoiding reckless and unbusinesslike competition, they will doubtless be able to carry out many of their plans.

## What the Trade Say.

The full reports of the meeting published in *The Iron Age* June 7 and 14 have evidently received much attention from merchants and manufacturers who were not present at the gathering, many of whom expressed their gratification at being enabled thus to enter into the spirit of the association and to inform themselves in regard to the subjects discussed. The publication of these papers will doubtless result in awakening a good deal of careful thought in regard to trade methods and conditions, as both the producers and distributors of goods are desirous of correcting many abuses which are creeping into business and encroaching upon the normal profits of trade. The extent to which it will be found feasible to carry out some of the plans suggested is a question to which many conservative merchants are giving attention, and is touched upon in the following letter, which comes from a well-known Hardware merchant in Western New York who has been actively identified with the trade for many years:

I have read with a good degree of interest the proceedings of the Southern Hardware Jobbers' Association. It brings to mind a similar effort 40 years ago.

E. Corning & Co. were importers and jobbers of Hardware at 81 John street, New York, as were many others in the city. Charles Parker and other manufacturers were putting their printed address on their packages and were sending out drummers for the country trade, and that was the beginning of the traveling salesman.

Mr. Corning was very indignant and called a meeting of the jobbers at the Astor House and formed a Hardwaremen's board of trade, had a big dinner and passed resolutions against the innovation, resolving that no American manufactured goods should be sold unless the addresses were left off of the packages.

Mr. Corning said to a member of our firm: "Now they are going to my customers and soon they will go to yours." His prophecy was fulfilled and has continued all these years. The consumer can get his Hardware about as low in price as can the retailer. I am quite interested to learn the result of the present move.

### In New York.

After the adjournment of the convention a number of the members of the association visited New York and accepted the invitation to visit the Hardware Club, its privileges having been extended to them by introductions from some of the members. Among those who visited the club rooms were the following:

W. A. Chenoweth, Francis-Chenoweth Hardware Company, Birmingham, Ala.

C. E. Thomas, May & Thomas Hardware Company, Birmingham, Ala.

William S. Bransford, Bransford Hardware Company, Nashville, Tenn.

William D. Krenson, J. D. Weed & Co., Savannah, Ga.

A. B. Palmer, Palmer Hardware Company, Savannah, Ga.

Charles H. Ireland, Odell Hardware Company, Greensboro, N. C.

John S. Brown, George Brown, Knoxville, Tenn.

J. C. Kirkpatrick, Kirkpatrick Hardware Company, Atlanta, Ga.

J. N. Melton, Melton Hardware Company, Meridian, Miss.

The trade in the city and the many merchants and manufacturers from other places enjoyed much the opportunity of thus meeting with representatives of the trade in the Southern States.

### Personal.

W. H. Cole & Sons, Baltimore, Md., long and favorably known as manufacturers' agents and Hardware jobbers, were represented at the late convention in Richmond by J. T. Quarles and T. W. Riley.

In a recent issue of *The Iron Age*, in mentioning some of the many manufacturing and jobbing houses present at Richmond, John H. Graham & Co., 113 Chambers street, New York, who were represented by William A. Graham and T. H. Gossett, were erroneously placed among the jobbing houses, when, as is well known, they should have been placed among the manufacturers as direct representatives.

J. C. Sproull, president of the Anniston Hardware Company, Anniston, Ala., while on his way North from Richmond, after the convention, received a telegram in Baltimore announcing the serious illness of his mother. Before he could leave on a train for home he received another telegram announcing her death.

Among the mercantile houses represented at Richmond by Henry H. Beers manufacturing or dealing in domestic and foreign Hardware, Cutlery, &c., were Schmachtenberg Bros., F. B. Gurney, Hatch Shear Company, J. Barton Smith Company, Imperial Cutlery Company, Gallert Mfg. Company and J. F. McCoy & Co.

### Syndicate Buyers.

The following letter from a well-known Southern house refers to their experience with syndicate buyers, and also touches in other ways upon questions to which a good deal of attention was given at the Richmond meeting:

We have had a syndicate buyer for five years, which is the full time that our company have been in existence. For this reason we could give no definite information as to the difference between not having a buyer or having one, as we can view the question from only one standpoint.

There are some decidedly good features in regard to having a buyer, and the principal objection that we see to having one is that it does not bring us in as close touch with the factories as if we purchased direct. We obtain many times a lower price through the syndicate buyer than we could do otherwise, but in many cases we cannot use them to advantage at all. We do a great deal of buying ourselves, and obtain prices from our New York buyer to settle by. It is an advantage to have a representative of this kind always in the market for all kinds of Hardware, as often he is informed of anticipated advances when probably we would not hear of them as promptly did we not have one.

The syndicate buyers are now seeking many customers who are not entitled to as low a price as a strictly jobbing house should get. I had occasion once to ask a syndicate buyer if certain small firms obtained the same prices as our company, and he replied: "No; that they let the factory make this extra profit on the small firms, which gave them a stronger pull with the factory for the benefit of the larger customers." I give you this for what it is worth, but it does not sound reasonable or businesslike, when the buyer is supposed to agree to give all of his customers the very lowest price that can be obtained when he places orders for goods.

One good feature about having a representative in New York is the expense that is saved in having small packages of goods sent to him for us for shipment; and then again he is of use to us in hunting up odds and ends that we would not know where to secure.

### Credits.

The following admirable paper by W. L. Magill, relating to the matter of credits, will be read with special interest:

Goods may be bought well and sold at profitable prices, but if at the end of our business year our books are filled with worthless accounts, we will reap a harvest of barren regrets. While it troubles us at stock taking time to find in our stocks lines of goods that have declined in price, how much more painful to have to transfer to our suspense ledger a large list of accounts that are considered doubtful or worthless. To overcome this trouble is of the greatest importance to all of us.

### UNFAVORABLE FINANCIAL POINTS.

In the first place, you no doubt have observed that the best salesmen on the road are most frequently the poorest judges of credits. The popular salesman is usually of a happy, genial disposition and looks only on the good side of life and sees his customer only in the most favorable light. With this happy turn of mind he makes many friends and customers and after he has taken the order he uses the same happy faculty to present his customer to his house under the most favorable conditions. One of the first things that a traveling man should be taught is that he is in a measure an assistant to the credit man, and he should be trained to look for unfavorable financial points in his customer as well as his good ones and avoid as far as possible sending in orders that are liable to be "turned down," for the influence brought about by refusing a man credit, no matter how hazardous the risk may

appear at the time, is far more lasting than we might suppose. It is therefore important to a house that they make as few enemies as possible in this manner.

### DOUBTFUL TRADE.

A man may be a good business man, honest, straightforward, &c., but may have associated with him a partner who, by intemperate, dissolute habits and outside speculation, has drawn his firm into financial straits. You stand on the safe side and decline the order, but he may later on extricate himself and get on a good, sound footing; but it will be a long time before he forgets the humiliation of having been flatly refused credit. In this connection we have found it profitable to have our men take the names of possibly doubtful trade, which we look up with special reports and inquiries before we solicit their business. We allow our traveling men full access to our files containing our special reports on the trade and encourage them in studying this information.

### THE CUSTOMER'S RECORD.

A credit man should neither be too lax nor too rigid, but should give each credit a thorough, careful, impartial investigation, looking closely to the customer's character, capacity, capital, habits, location, mode of doing business, insurance carried, &c. We do not attach as much importance to the local reports obtained in a customer's own town, except as to his habits and general standing in the community, as we do to the trade and agency reports. In a man's own home his next door neighbors do not know much of his actual financial condition; they do not know how much he owes in the market, or how much is due or past due; how much is due him from his customers, &c. In a general way commercial agency reports help us a great deal and are valuable, but we have found that trade reports, obtained from jobbing towns from jobbers in the different lines who are having actual business transactions with a customer, show more clearly than anything else the customer's record as a desirable credit risk. We use two blanks for obtaining information of this sort—one we use in sending out of the city and the other we send around in our town, and this blank, if carefully and conscientiously filled out by our neighboring jobbers in other lines in our own town, will reveal promptly whether a customer is a man that we want on our books or not. It is also our custom to keep our traveling men advised each month of the condition of every account in their own territory.

### EDUCATE RETAILERS.

Our traveling men are also informed that where ratings are very low no lapping of bills will be allowed. This makes them more careful to collect accounts that are due, as they do not relish the idea of having us write to their customers that we cannot ship the goods until their account that is now due is paid. The great idea of the jobbers should be to educate the retail buyer to pay promptly, and then the retailer, in turn, will be more exacting with his patrons. If the members of the Southern Hardware Jobbers' Association could enter into an agreement that no bills should be dated ahead, and that our terms should be 60 days and no longer, and that there will be no lapping of bills after the account is due, we think the chances for bad debts will be considerably lessened and the country in general benefited. It is the province of the jobber to do what he can to make



the retailer a prompt payer and a systematic, successful business man, thereby insuring to the jobber a lasting customer; and if the retailer is trained in this direction he in turn will educate his trade to do the same way, thereby increasing the general prosperity of the country.

### Trade Items.

**C**HAS. G. ETTE, who who has been president and general manager of the Ette & Henger Mfg. Company, St. Louis, since their inception in 1888, has been compelled to resign on account of ill health. Mr. Ette has disposed of his stock in the concern, which stock has been purchased by the remaining stockholders. At the last regular annual meeting, held in May, C. L. Pleuger, formerly secretary, was elected president and general manager, H. W. Henger secretary and treasurer and B. H. Sanders superintendent. These changes will not in any way interfere with the policy of this concern, which will be conducted on the basis heretofore followed of carrying full and complete lines of Hardware, plumbers' and water works supplies of the latest and most approved patterns and styles, as well as a full assortment of staple goods.

**THE ROYAL** is a new low priced Skate recently brought out by Keene Mfg. Company, Keene, N. H., for whom Bigelow & Dowse Company, Boston, are general agents. As will be seen by reference to the illustration of the Skate in their advertisement in another part of the paper, the Royal has a wide range of adjustment, so that it will take hold of the smallest heel and widest sole. The shape of the runner is unique and is considered an improvement over older styles. All the parts as well as the runner are, it is stated, cut from cast steel.

**W. C. HEIMBUCHER** and **WM. B. WEBBER** have formed a copartnership to act as manufacturers' agents, under the firm name of Heimbuecher & Webber, with office in American Central Building, St. Louis. They will represent Hoague & Peck, Chicopee, Mass., who manufacture Can Openers, Automatic Drills, Tracing Wheels, Ice Picks, Nail Sets, &c. Geo. A. Bothwell will represent Heimbuecher & Webber in Texas and Arkansas. W. C. Heimbuecher, who has been associated with his father, John H. Heimbuecher, who is agent of the Salem Wire Nail Company, does not sever his connection in this direction, but will still be identified with the Salem Wire Nail Company.

**IN THE ADVERTISEMENT**, in this issue, of James W. Eustis Company, Idlewild Hammock Mills, 19 Pearl street, Boston, attention is directed to sample bales of Hammocks which the company are putting up especially for the retail trade. The bales contain 12 numbers of Hammocks, all medium and low priced goods, which the manufacturers state will yield 50 per cent. profit.

**WILLIAM SCHMACHTENBERG** of the firm of Schmachtenberg Bros., Cutlers, 96 Chambers street, New York, has returned from a two months' trip to Solingen, Germany, whither he went April 12. He refers to business conditions abroad as somewhat better than those at present prevailing in this country.

**W. B. BELKNAP & Co.** of Louisville, Ky., have closed a contract for the printing of a catalogue which it is probable will be one of the most complete ever issued by a mercantile firm in the South. The number will be between 4000 and 5000 copies, each con-

taining 1200 pages, with from 6000 to 7000 engravings. The edition will weigh when completed about 25 tons and each copy about 12 pounds. It will consume two and a half carloads of paper, 2 tons of tar board and 1200 sheepskins, and will cost about \$15,000.

**REYMOND & GOTTLOB**, formerly at 335 Broadway, have recently removed to 830 Broadway, near Twelfth street. They are importers and jobbers of Aluminum as wrought into fancy goods, cooking utensils, sheets, wire and medals of both foreign and domestic manufacture. They represent manufacturers of this class of goods both here and abroad. In a list just published this concern call attention to 200 different articles embracing Household Ware, such as Chafing Dishes, Coffee Pots, Funnels, Drinking Cups, Napkin Rings, Strainers, Sugar Bowls, Spoons, Cream Pitchers, &c., Trays, round and square, fancy goods in great variety, Cooking Utensils including Saucepans, Frying and Baking Pans, Pie Plates, Washbowls, Hotel Pans, Teakettles, Washboilers, &c. There are also a number of smokers' articles.

### Price-Lists, Circulars, &c.

**O**NEIDA COMMUNITY, Kenwood, N. Y.: "How to Catch Wolves with the Newhouse Wolf Trap." A catalogue with illustrations of Traps describes what are referred to as the latest and most successful methods of catching wolves, as practiced by the professional trappers of the North American continent.

**THE PHOSPHOR-BRONZE SMELTING COMPANY**, 2200 Washington avenue, Philadelphia: "List of Current Qualities of Elephant Brand Phosphor-Bronze Alloys." The purposes for which the various grades are best adapted are described, and other particulars given which make the list valuable for reference.

**THE PLUME & ATWOOD MFG. COMPANY**, 18 Murray street, New York: Kerosene Oil Burners, Lamps, Lamp Trimmings, &c. A catalogue of 100 pages illustrates with prices and descriptions an extensive line of Burners, Feeder Caps and Collars, Globe and Shade Rings, Hand, Bedroom and Kitchen Lamps, Royal Central Draft Lamps, in a variety of styles and patterns; Bracket and Harp Lamps, Banner Lamps, &c. The book is printed in red and black, on a fine quality of paper, with many new illustrations. The company expect to issue in about ten days a catalogue devoted to their large and complete line of Banquet Lamps.

**MATTHAI, INGRAM & Co.**, Baltimore, Md.: Old Time Tinware. Illustrations and prices of Tinware are given in a 44-page catalogue, the grade of the material used in the manufacture of each article being shown under the illustration. Every article is wrapped, tagged and labeled, "old time" implying honest material, skilled workmanship and finest finish.

**TELEGRAM CYCLE MFG. COMPANY**, Milwaukee, Wis.: Telegram Bicycles and Sanger racers. A catalogue shows Telegram machines in full roadsters, light roadsters and ladies' wheel; also the Lightning Messenger and Special Sanger racer.

**WASHBURN & MOEN MFG. COMPANY**, Worcester, Mass.: Springs. In a catalogue devoted to a large variety of Springs, the manufacturers remark that since issuing their first catalogue they have made many improvements in their Spring department, among

which is the making of their own Steel. It is further stated that the company have had large and practical experience in making Springs for agricultural implements, and also for making Springs for all kinds of Bicycles.

**BYRON JACKSON MACHINE WORKS**, San Francisco, Cal.: Haying, Harvesting and Irrigating Machinery. An illustrated catalogue, No. 14, shows a line of the Jackson Harvesting Machinery, Traction Engines, Wind Mills, &c.

**THE LEAVITT MOTOR COMPANY**, Providence, R. I.: Battery Motors. An illustrated catalogue and price-list shows Motors weighing from 1½ to 6 pounds, to run on acid batteries, for running fans, models, watch makers' and jewelers' lathes, sewing machines, &c., the larger size developing ⅛ horse-power. There are also illustrations of Batteries. These goods are sold separate or in complete outfits.

**DOMINION WIRE MFG. COMPANY**, Montreal and Toronto: Wire Goods, &c. A budget of different colored pages with artistic cover and ribbon fastening gives lists and illustrations of Lyman Fencing, Iron, Steel, Copper, Brass and Tinned Wire, Wood Screws, Wire Nails, Bright Wire Goods, Jack Chain and Spring Cutters.

### It Is Reported—

#### Arizona.

That Dawson & Fiske are a new Hardware firm at PHOENIX.

#### Florida.

That C. F. Hamblen, St. AUGUSTINE, has just commenced the erection of a store building adjoining his warehouse which, when completed, will give him about 25,000 square feet of floor space and about 10,000 square feet of shelving.

#### Georgia.

That the Lowry Hardware Company, ATLANTA, have purchased the Bicycle stock and business of the Nunnally Company.

#### Illinois.

That G. G. Shearer is about to engage in the Hardware business at MAQUON.

#### Indiana.

That R. R. Cranmer's Hardware store, at FRANKTON, was destroyed by fire on the 10th inst.

That the Marion Hardware Company, MARION, have been incorporated, with a capital stock of \$12,000.

That the safe in the Hardware store of Fishel Bros., HOPE, was blown open and robbed early on the morning of the 12th inst.

#### Iowa.

That W. D. Rust has recently entered the Hardware business at WEBSTER CITY.

#### Maine.

That the firm of Stickney & Wigin, Stove dealers, BELFAST, have been dissolved, Mr. Stickney having bought out his partner. The business will be continued by Mr. Stickney alone.

#### Minnesota.

That Huntington Bros. are a new Hardware firm at LIVERNE. C. E. and G. L. Huntington are the members of the firm.

That Hunt A. Wyer has purchased the stock of Joseph Helm, Hardware merchant, at RED LAKE FALLS. The price paid was \$5000.

That George Wolhuter's Hardware store, at ALBERT LEA, was damaged by fire on the 31st ult. to the extent of \$1500.

That thieves broke into the Hardware store of Fuller & Denning, PARK RAPIDS, on the 3d inst. and stole about \$75 worth of Guns, Revolvers, Knives, &c.



**New York.**

That the Hardware store of E. E. Parker, AKRON, was burglarized on the 8th inst.; \$100 worth of Knives, Revolvers and Razors were taken.

**Ohio.**

That burglars visited the Hardware establishment of J. S. Abbott, at 115 South High street, COLUMBUS, on the 11th inst. and carried off about \$150 worth of goods.

That C. Smith, formerly with Carter & Huckins, Hardware merchants, of OBERLIN, has removed to Belleville, where he has opened a Hardware store.

**South Dakota.**

That Booth Bros., MITCHELL, have disposed of their stock of Hardware to W. J. Healey. The new proprietor is referred to as one of the most energetic and capable business men in the vicinity.

**Texas.**

That Sutton & Sharp's Hardware store, at GEORGETOWN, was robbed on the 30th ult.

That the firm of Ragsdale, McKinney & Co., BONHAM, have sold their Hardware business to Chas. and Frank Davis and James Biggs, who will continue it under the firm name of Chas. Davis & Co.

That W. L. Vicker & Co.'s Hardware store, at WICHITA FALLS, was burglarized on the 5th inst., a lot of Razors and Guns being taken.

**Wisconsin.**

That the Hardware store of Osborn & Barlow, at RIPON, was destroyed by fire on the 9th inst.

That Gottlieb Kurth and his son Frank Kurth have opened a new Hardware store at WAUSAU.

That W. J. Behn, REEDSBURG, is erecting a new building which on completion he will occupy with his Hardware business. The building is 60 x 75 feet, two stories high, equipped with all modern improvements.

*The Hardware trade throughout the country are requested to report business changes, improvements and other matters of trade interest suitable for mention in this department.*

**Paints and Colors.**

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

**White Lead.**—A rather dull and uneven market has been experienced. Competition continues keen and previous lowest prices, it is stated, have been shaded for both Dry Lead and Lead in Oil, with the cut most prominent in the instance of quick process product. Dry Lead of this variety went at slightly less than 4¢ in carload lots and at 4¼¢ for smaller quantities. Old process is at about 4¼¢ @ 4¾¢, in carload lots. Lead in Oil very irregular, particularly on business from second hands, moderate sized lots selling at as low as 5¼¢ in store. Mixed Leads are also unsettled and irregular.

**Red Lead.**—Domestic brands have met with limited sale and the market is flat, with prices rather weak but showing no radical change. Moderate orders have been placed for foreign brands for future delivery, chiefly at old prices.

**Litharge.**—Only a moderate business has been effected, and the market remains bare of new features, prices being quite steady for all grades.

**Orange Mineral.**—In this article the dealings are very moderate at present and the demand is unimportant, there

being less than the usual interest in forward deliveries. Prices have undergone no change.

**Zincs.**—German Oxide is being offered very freely for prompt or near future shipment, and competition has been keen enough to cause offers to sell at a shade under 5¢, delivered here. American Oxide is without positive change in price, but the market shows rather weak tone and is quieter than usual at this season.

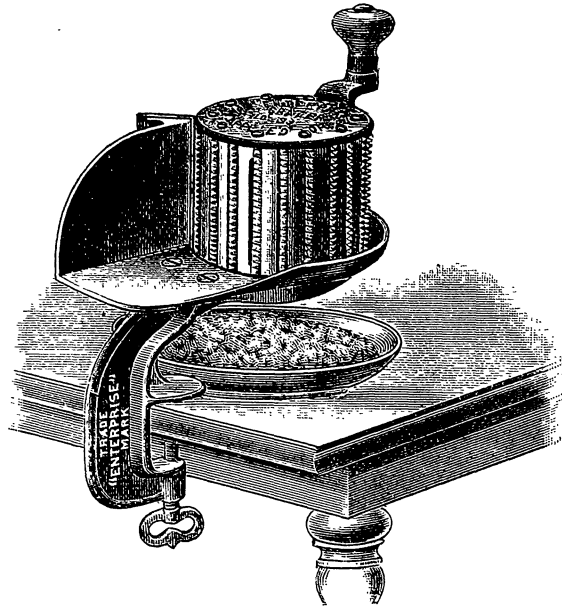
**Colors.**—No important changes in prices of either Dry or Oil Colors have taken place, and as a whole the condition of the market is much the same

and 55¢ for early shipments. Coconut Oils have undergone no change.

**Spirits Turpentine.**—Buyers have taken hold very indifferently, but their purchases sufficed to hold prices very steady in the absence of any Southern selling pressure.

**Enterprise Grater No. 93.**

The Enterprise Mfg. Company of Pennsylvania, Philadelphia, for whom J. C. McCarty & Co. are agents, 97 Chambers street, New York, are offering



Enterprise Grater No. 93.

as it was a week ago. Sales are on the same moderate scale and the demand is commonplace in the extreme.

**Oils and Turpentine.**

**Linseed Oil.**—Enhanced cost of seed has prompted quite liberal buying of Oil in the West, and it is claimed that all cheap lots of the latter have been absorbed. In the New York market little has been done outside of routine business, but prices are very stiff, and it is intimated that a further advance will be made ere long. The inside prices now are 52¢ for Western and 53¢ for city brands. Oil made from Calcutta seed is held about 2¢ higher.

**Cotton Seed Oil.**—Dealings in both crude and refined Oil have been moderate, but enough stock is taken by large Western consumers to check excessive shipments to this quarter and prices therefore remain very steady. Business here has been chiefly at prices on the basis of 29¢ for prime crude and 32½¢ @ 33¢ for prime Yellow.

**Lard Oil.**—No further change in prices has taken place. The extremes for prime quality present make Oil are 56¢ @ 58¢. The undertone of the market is rather weak, however, owing to slowness of demand and the unsettled condition of the market for raw material.

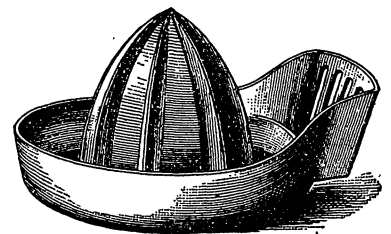
**Fish Oils.**—The entire stock of crude Menhaden of last year's make, owned by the association, has been sold to exporters. The quantity is understood to be 12,000 barrels, but no information as to the price is given. New Season Oil will, it is understood, be at prices on the basis of 22¢ for price. Sperm is firmer, but unchanged. Whale remains very quiet.

**Miscellaneous.**—Common Olive Oil in barrels is rather weaker under the influence of free offering. Sales have been made at 56¢ for stock on the spot

the tinned grater herewith illustrated. In use it is clamped to a table or shelf and the article to be grated is placed on the platform and fed or pushed against the revolving cylinder. The grater is especially adapted for grating horse-radish, cocoanut, &c., and can no doubt be used for many purposes by hotels, restaurants and private families.

**Monitor Aluminum Juice Extractor.**

Sterling Aluminum Company, 1195 Fulton street, Brooklyn, N. Y., are offering the aluminum juice extractor here shown. It is cast of pure aluminum



Monitor Aluminum Juice Extractor.

and has well defined ridges on the cone. It has a large reservoir to hold the juice and an ample spout and strainer. It is not necessary to use it in connection with a cup or glass, as the reservoir catches the juice, so the extractor may be used anywhere. The manufacturers claim that fruit acids do not affect it; that it will not corrode or tarnish; that it will not break like glass, and that it will last forever. Extractors are made of glass in the same shape and style.

### The Champion Filter.

The accompanying illustrations show a filter offered by the Champion Safety Lock Company, 74 Frankfort street, Cleveland, Ohio. The filter is made of special metal highly finished, and as il-

that cleaning the stone of the filth it extracts from the water is one of the natural and indispensable requirements of the proper working of the filter, and that it can be done easily in less than two minutes. A Y is furnished as in Fig. 3, also illustrated in use in Fig. 1, for attaching an extra faucet, so that water

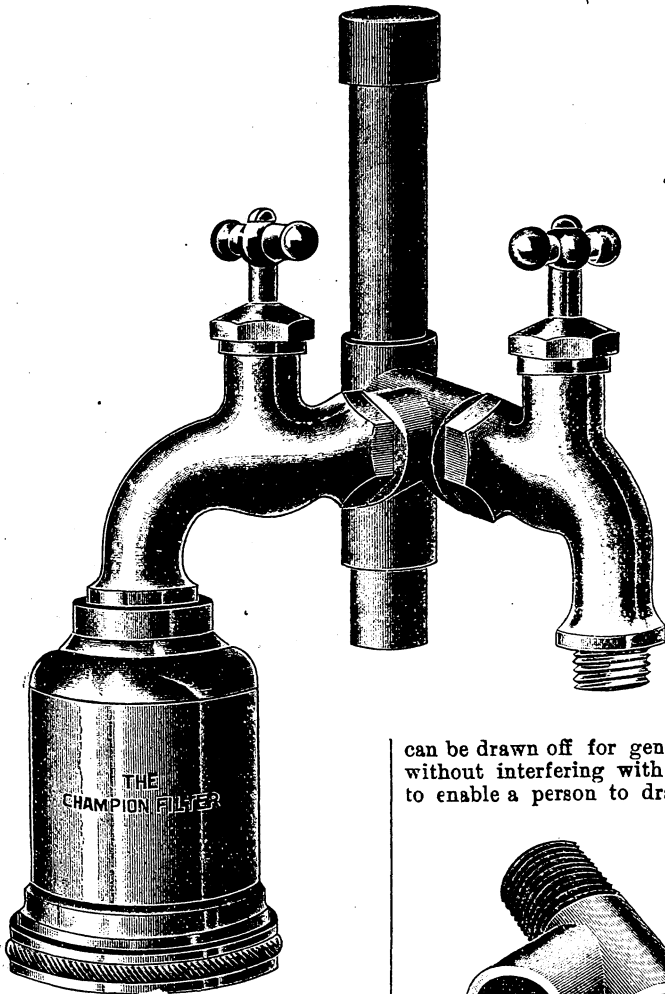


Fig. 1.—The Champion Filter.

lustrated in Fig. 1 is convenient in size for attaching to any faucet. The cut represents the filter half its actual size. In Fig. 2 the metal part of the filter is cut away, showing the natural stone through which the water filters.

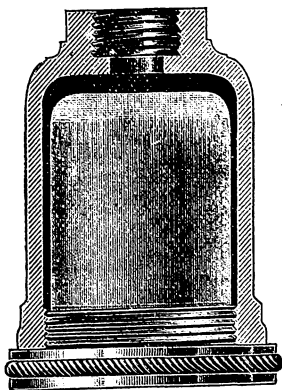


Fig. 2.—Filtering Stone.

It is stated that it filters a gallon of water in five minutes under ordinary pressure, and that though filtering rapidly it extracts all impure matter, giving the water a clearness equal to that of the purest springs. It is explained

can be drawn off for general purposes without interfering with the filter, or to enable a person to draw the warm

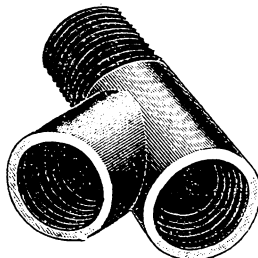


Fig. 3.—The Y for Extra Faucet.

water from the pipe so as to get cool water from the filter.

### The Goodell Bread and Cake Knife.

The cut here shown represents a bread and cake knife put on the market by Goodell Company, Antrim, N. H. The



The Goodell Bread and Cake Knife.

knife has a curved, saw toothed cutting edge, and it is remarked by the company that the high grade of steel used in the blade enables it to be made very thin. The side of the blade is perfectly flat, the corrugations or curves extending about  $\frac{3}{8}$  inch from the edge, being the same depth their entire length.

The makers state that when necessary the blade can be ground on the side opposite the grooves without changing

the shape or cutting qualities of the edge in the least; also that no skill is required to do this, as it would be impossible to get the edge out of shape. The manufacturers claim that the feature of sharpening is peculiar to this knife, and that it can be sharpened again and again and remain practically as good as new. The point is also made that the style of the handle, shape of the blade and the general appearance of the knife are attractive. The knife is referred to as particularly adapted to cutting hot bread and cake.

### Wick Raising Movement and Lighting Lift.

The Plume & Atwood Mfg. Company, 18 Murray street, New York, are applying improvements to all their Nos. 1 and

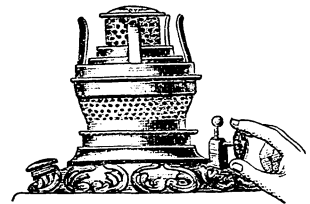


Fig. 1.—Ratchet Wick Raising Movement.

2 Royal lamps and founts as herewith illustrated. The ratchet wick raising movement shown in Fig. 1 gives, it is stated, perfect control of the wick with exactness in adjustment. The point is made that it overcomes the objection to the draw bar lift, which in regulating is apt to move beyond the point desired, causing the annoyance of a smoked

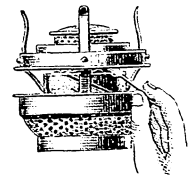


Fig. 2.—Lighting Lift.

chimney or an extinguished flame. The lighting lift in Fig. 2 lifts on a spiral movement and remains in position while lighting without removing either shade or chimney, leaving the hands absolutely free. The improvements are put on the Royal hand, table and banquet lamps of different designs, and also on those in wrought iron patterns.

### Zeolithe.

Dame, Stoddard & Kendall, 374 Washington street, Boston, are offering

a razor strop preparation known as Zeolithe. The preparation is in stick form covered with foil, inclosed in wooden cylinder shaped boxes upon which are directions for using. A dozen packages are put up in a pasteboard box, mounted in easel form on a card for standing on a showcase or counter. The portion of the card above the box is attractively printed, giving the name, use and retail price of the preparation.

The firm state that they have given it a thorough trial and are convinced that it is an article of real merit and that many of their customers have duplicated their orders, in some cases reordering as many as a dozen times. In use the preparation is spread in a thin, even coating on one side of the strip, and the razor stropped in the usual manner.

#### Millers Falls Automatic Screw Driver and Borer.

Millers Falls Company, Millers Falls, Mass., and 93 Reade street, New York, are offering the screw driver and borer here shown. The spiral screw driver represented in Fig. 1 is provided with a finely finished cocobola handle and nickel plated metal parts. A feature of the tool is a revolving sleeve which is grasped by the left hand when the tool is working. The point is made that while the sleeve is a great advantage in driving screws, it also enables the tool to be used as an automatic drill. There is a locking device on the

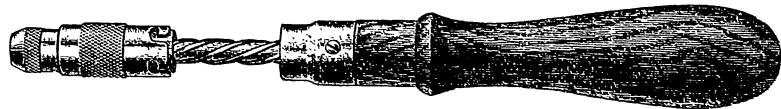


Fig. 1.—Millers Falls Automatic Screw Driver and Borer.

sleeve which prevents the spiral running out, in using the tool for driving screws, when the handle is held perpendicularly. A four-jawed drill holder, shown at the left of the screw driver bits in Fig. 2, is provided for holding the drills.

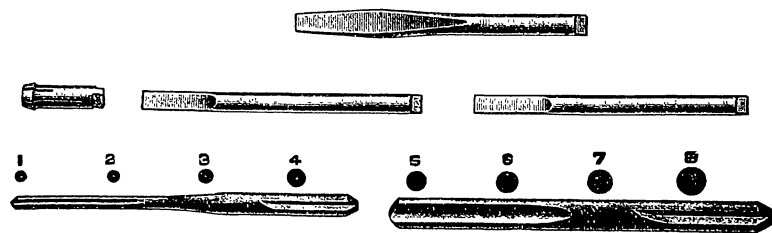


Fig. 2.—Screw Driver Bits and Drills for Screw Driver.

When the tool is used as a borer the chuck nut is taken off and the drill holder is inserted in the screw driver socket, into which the drill is secured. The three screw driver bits are nickel plated, each 4 inches long, and made to fit screws of varying sizes. The eight drills are packed in a cylinder shaped wooden box, the sizes of the drills being shown under the numbers in Fig. 2. The screw driver and bits are furnished with or without the drills as desired, the sets being packed one each in a neat pasteboard box.

#### Fish Tail Wood Carving Tools.

E. V. Harbeck & Co., 115 Mullett street, Detroit, Mich., are offering fish tail wood carving tools in sets, handled and sharpened ready for use. Heretofore the company have not offered their tools handled and sharpened, but have fitted them up to order when customers insisted upon it. The company state that these goods are identical with their Arnold and Harvey regular fish tail tools, being made by the same workmen, tempered the same and of the same material. Attention is called by the makers to their No. 8 set, consisting of eight tools, as follows: Straight

chisel, skew chisel, bent chisel, large and small gouge, back bent gouge, veiner and parting tool.

#### Corrugated Slaw and Kraut Cutters.

Tucker & Dorsey Mfg. Company, Indianapolis, Ind., are putting on the mar-

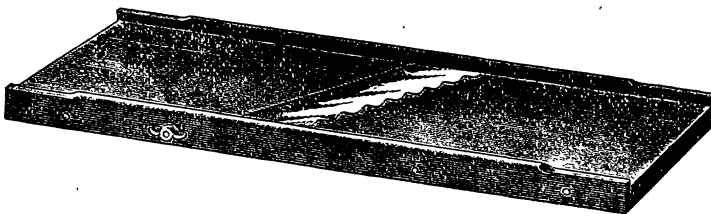


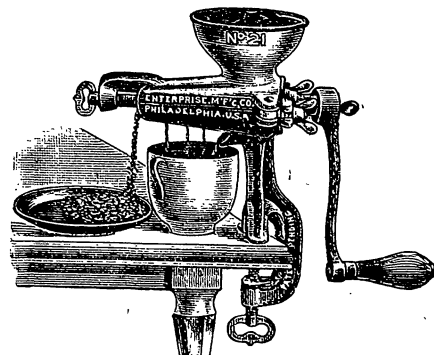
Fig. 1.—Corrugated Slaw Cutter.

ket a fancy line of slaw and kraut cutters, as shown in the accompanying illustrations. The knives are nickel plated and ground with corrugated edges. The goods are referred to as made throughout of extra quality material and of handsome finish. Particular atten-

tion is called to the patented device for the adjustment of the knives, it being explained that the bolts are loosened, the knives set for the desired cut, and the bolts again tightened, no other directions being necessary. By taking out

#### Enterprise Juice Extractor No. 21.

The cut here shown represents a juice extractor put on the market by the Enterprise Mfg. Company of Pennsylvania, Philadelphia, for whom J. C. McCarty & Co. are agents, 97 Chambers street, New York. The manufact-



Enterprise Juice Extractor No. 21.

juice from fruits. It is explained that the machine being tinned no metallic or inky flavor will be imparted to the material used, and that the dryness of the pulp or refuse can be regulated by the thumb screw at the outlet.

#### The Lobl Tinner's Shears.

In the accompanying illustration is shown a general view of the Lobl shears, a tool intended for roofers, tinner, cornice makers, &c., and made by Eugene Kulinski & Co., 91-93 Thompson street, New York. The peculiar shape of the blades will be noticed, and the special feature of the shears is the method of pivoting them, so that a slot

W. M. CRANE COMPANY, 838 Broadway, New York, manufacturers of

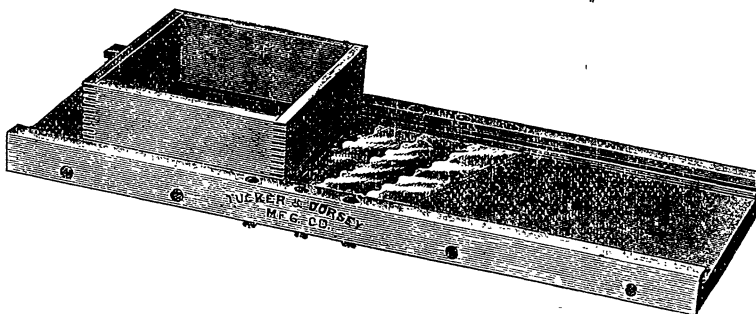


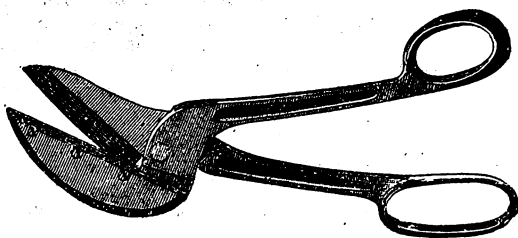
Fig. 2.—Corrugated Kraut Cutter.

and dealers in gas appliances, are offering a tailors' Stove for use in factories with a capacity of 1 to 50 burners, with independent hoods and burners for each iron. It is their endeavor to make their place a headquarters for everything having merit in the way of appliances for use in connection with gas.

permits the metal to be run straight back as it is cut, and thus the metal does not require straightening after cutting. It is further pointed out that these shears will cut corner shaped strips or leaders, &c., of metal as heavy as No. 24 iron or soft steel. The shears are made of steel throughout, with removable blades, so that they

are easily sharpened. The shears are made in two sizes, No. 14 being 14 inches long, with jaws 4 inches in length, and weighs 2 pounds. No. 2

shaken. The extractor and two glasses make the combination juice extractor, shaker, strainer and mixer, and are packed together in one box. In Fig. 2

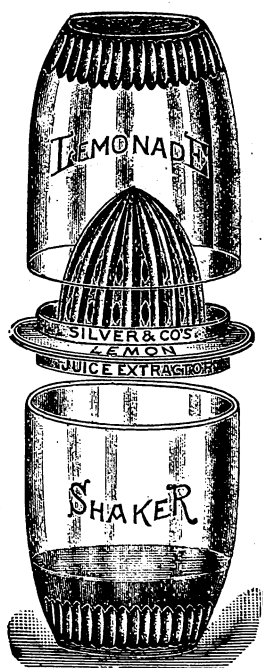


*The Lobl Tinnars' Shears.*

is 15½ inches long, 4½-inch jaws and 2½ pounds in weight.

#### Aluminum Juice Extractors.

The cuts here shown represent aluminum juice extractors put on the market



*Fig. 1.—Juice Extractor, Shaker, Strainer and Mixer.*

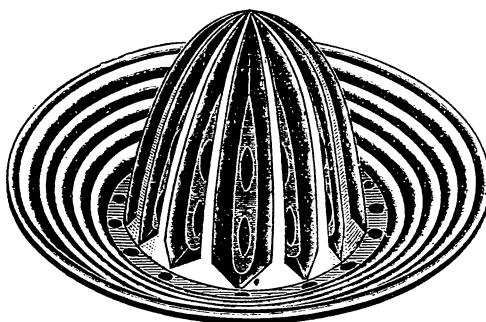
by Silver & Co., 304-310 Hewes street, Brooklyn, N. Y. The extractor shown between the two glasses in Fig. 1 is



*Fig. 2.—Aluminum Shaker, Strainer and Mixer.*

stamped from pure aluminum, and is made to fit the glasses with which it is supplied, so that lemonade may be

the set is shown made entirely of aluminum with the extractor locked between the cups, weighing complete, it is stated, less than 3 ounces. The cups hold ½ pint each and as they nest in a package 3 x 4 inches are adapted to use in traveling and at picnics. The squeezer and shaker in Fig. 3 has perforations around the base of the cone through which the juice runs into the glass upon which the squeezer is placed. After the juice has been extracted and water and sugar added, an empty glass is placed on the top of the extractor, when the contents may be



*Fig. 3.—Aluminum Squeezer and Shaker.*

thoroughly shaken, and the liquid strained off, leaving the seeds and pulp in the strainer. The extractor in Fig. 4 forms both a juice extractor and juice receptacle, complete in one piece. It is 4 inches in diameter, 2 inches high, and weighs less than 1 ounce. The manufacturers claim for these aluminum extractors that they are practically unbreakable; that there is no danger of particles of glass getting into the beverage; that there are no sharp edges to

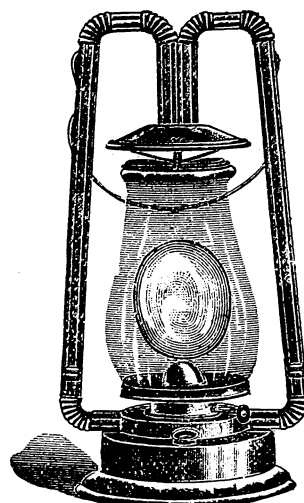


*Fig. 4.—Aluminum Cup Juice Extractor*

cut the fingers or to do harm; that they are as pure as gold and as strong as steel, and that they are not affected by fruit acids of any kind.

#### The Open Sesame Tubular Lantern.

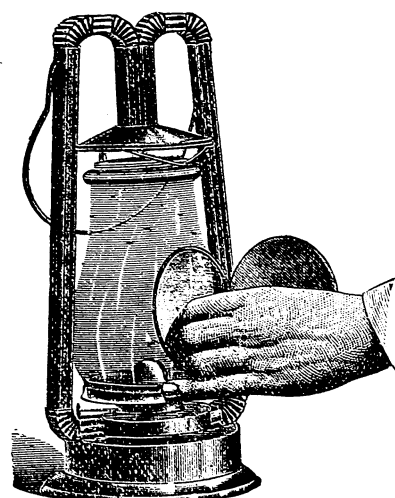
Nail City Stamping Company, Wheeling, W. Va., are offering the lantern



*Fig. 1.—Open Sesame Tubular Lantern.*

illustrated in Figs. 1 and 2. The lantern is provided with a reflector which, it

is stated, is far ahead of any "bull's-eye." This is hinged so as to open



*Fig. 2.—Lantern Open for Lighting.*

easily for lighting or extinguishing the flame.

JOHN A. PILCHER of the Simmons Hardware Company, St. Louis, Mo., who left New York for a business trip abroad on April 7, arrived in this city on the steamer "Spree" June 7.

**The Belfast Sell Fast Clothes Racks.**

The Derby Hat & Clothes Rack Company, 14 Reade street, New York, are putting on the market clothes racks as

viates the necessity of driving nails or screws into tent poles, which is prohibited, it is understood, by the military authorities of some countries; and also has the advantage of allowing the projecting rods to be turned down out of

plate, surface anchor and top of peculiar design, affording convenient hitching with either strap, rope, or with the weldless wire chain shown attached,

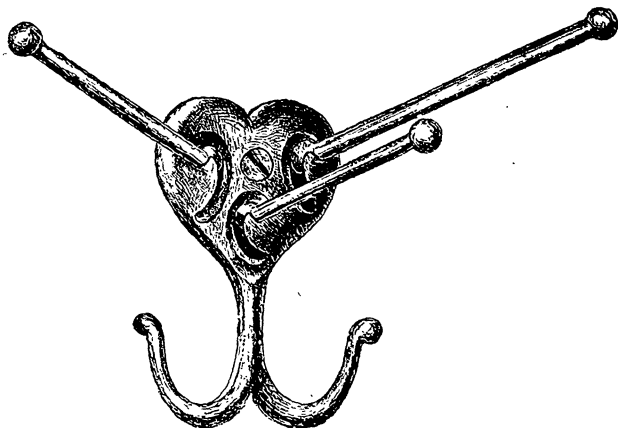


Fig. 1.—The Belfast Sell-Fast Clothes Rack.

shown in the accompanying cuts. The rack is shown in Fig. 1 with three rods extended ready for use, with two hooks below, and in Fig. 2 with the rods turned down out of the way. The rack is fastened with one screw, and has a lug on the back which presses into the wood to keep it from turning. The racks are designed for use on the backs of doors, in closets and presses and on walls. The rack illustrated in Fig. 3 is designed for displaying goods in stores. The arrangement of the rods is the same as in the clothes rack, enabling them to be turned up or down. Two sets of rods are shown in the cut, but the point is made that any number of sets desired may be attached to the same standard.

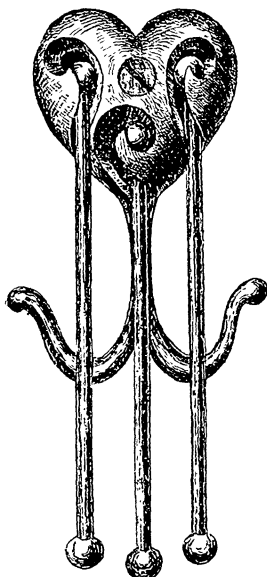


Fig. 2.—Clothes Rack Closed.

The device shown in Fig. 4 consists of a spring brass band to which rods, one of which is shown more in detail in Fig. 5, are attached, for use on tent poles. After the band is sprung around the tent pole it is secured in place by means of a thumb nut. One rod is adapted to holding a candle, while the others may be utilized for hanging articles of clothing, &c. As many of the bands may be placed on one pole as is desired. The device ob-

the way when not in use. The rack is equally as serviceable for camping parties as for the use of militia.

**Tubular Steel Hitching Post.**

The hitching post herewith shown has recently been put upon the market

**Tubular Steel Hitching Post.**

one of which is furnished with each post. It is remarked that a novel method is used for attaching the top and the base anchor to the post, the steel tube being compressed about a recess in the casting, thus affording, it is

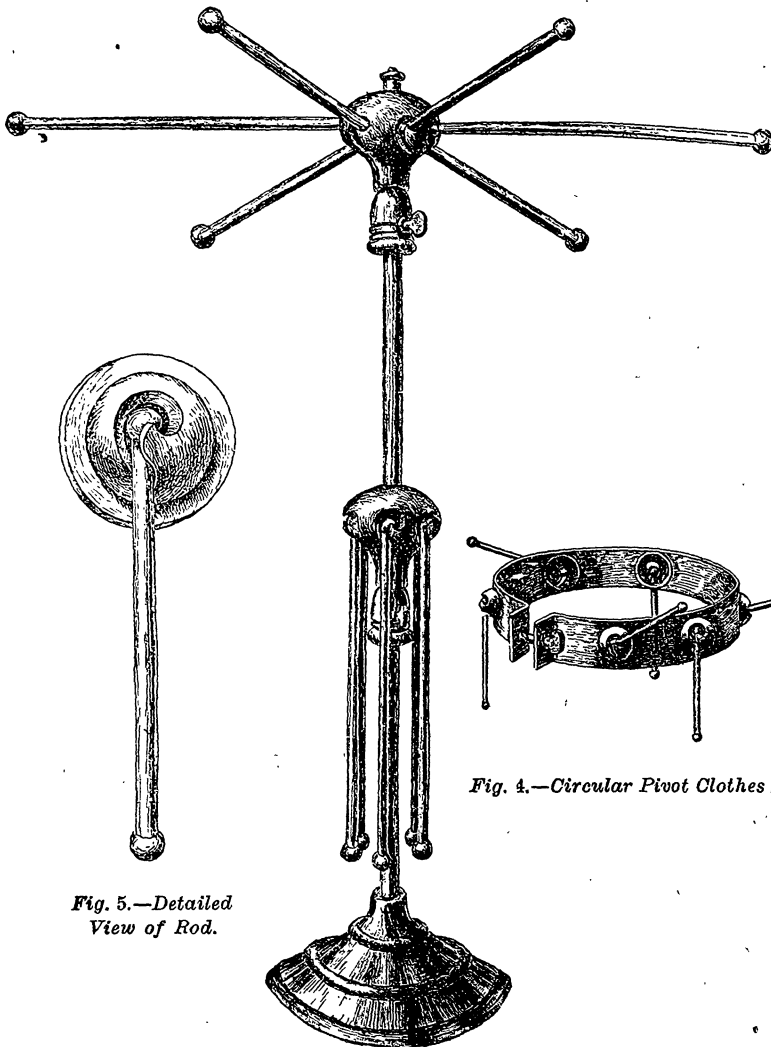


Fig. 5.—Detailed View of Rod.

Fig. 3.—Rack for Displaying Goods.

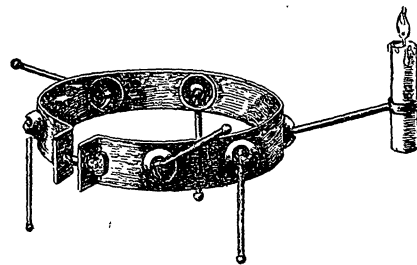


Fig. 4.—Circular Pivot Clothes Rack.

by the Hartman Mfg. Company, Ellwood City, Pa. The post is furnished with a broad, strongly ribbed base

stated, without riveting, one of the strongest and most durable connections possible.



# Current Hardware Prices.

JUNE 20, 1894.

NOTE.—The quotations given below represent Current Hardware Prices, whether made by manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail Hardware merchants. Very small orders and broken packages often command higher prices.

The character @ is used to indicate a range of price: thus discount 50 & 10% @ 50 & 10 & 5%, signifies that the goods in question are sold at prices ranging from 50 & 10% to 50 & 10 & 5%.

**Adjusters, Blind—**

Domestic..... $\frac{1}{2}$  doz \$3.00, 33 $\frac{1}{2}$ ¢@33 $\frac{1}{2}$ ¢@10%  
Excelstor..... $\frac{1}{2}$  doz \$10.00.....50¢@10%  
North's.....list net @ 10%  
Zimmerman's—See Fasteners Blind.

**Ammunition—See Caps, Cartridges, Shells, &c.****Anvils—****American—**

Hagle Anvils,  $\frac{1}{2}$  in 9 $\frac{1}{2}$ .....15¢@15¢  
Horse shoe brand, Wrought.....11¢@11¢  
Moore & Barnes Mfg. Co.....33¢

**Imported—**

Armstrong Mouse Hole.....9¢@10¢  
B. & H., machine finished.....10¢@11¢  
Trenon.....9¢@10¢  
Wilkinson's.....10¢@10¢  
Peter Wright's.....10¢@11¢

**Anvil Vise and Drill—**

Allen Anvil and Vise \$3.00.....40¢@10%  
Cheney Anvil and Vise.....25¢  
Millers Falls Co., \$18.00.....20¢  
Star.....45¢

**Apple Parers—See Parers Apple, &c.****Augers and Bits—**

Boring Machine Augers.....70¢@70¢@10%  
Car Bits, 12-in. twist.....50¢  
Common Augers and Bits.....70¢@70¢@10%  
Cincinnati Bell-Hangers' Bits.....80¢@10%  
Forster Pat. Auger Bits.....15¢  
Jennings' Pattern Car Bits.....40¢  
Jennings' Pattern Auger Bits.....60¢  
J. E. Jennings & Co., No. 10, extension 11 $\frac{1}{2}$ .....40¢  
C. E. Jennings & Co., No. 30.....60¢  
C. E. Jennings & Co., Auger Bits,  $\frac{1}{2}$  set 32 $\frac{1}{2}$  quaters, No. 5, 5 $\frac{1}{2}$ ; No. 8, 3 $\frac{1}{2}$  to 25¢  
Russell Jennings' Augers and Bits 25¢@10%  
Lewis' Patent Single twist.....15¢@10%  
H. Kommedien Car Bits.....20¢  
Pugh's Black.....30¢  
Pugh's Jennings Pattern.....30¢  
Snell's Bits.....60¢@60¢@10%

**Bit Stock Drills—**

Cleveland.....50¢@10%  
Cincinnati, for wood.....45¢@10%  
Cincinnati, for metal.....50¢@10%  
Morse Twist Drills.....50¢@10%  
New Process Twist Drill Co.....50¢@10%  
Standard.....50¢@10%  
Syracuse, for metal.....50¢@10%  
Syracuse, for wood (wood list), 30¢@30¢@5%

**Expansive Bits—**

Clark's small, \$18; large, \$26. 35¢@35¢@10%  
Ives' No. 4,  $\frac{1}{2}$  doz. \$60.....40¢  
Steer's, No. 1, \$26; No. 2, \$18.....35¢@40%  
Stearns' No. 2, \$48.....20¢  
Swan's.....40¢

**Gimlet Bits—**

Bee.....25¢@25¢@10%  
Common..... $\frac{1}{2}$  gross \$2.50@3.00  
Diamond..... $\frac{1}{2}$  doz \$1.25.....40¢@10%  
Double Cut:  
Hartwell's..... $\frac{1}{2}$  gro., \$10.00.....40¢@10%  
Douglases.....40¢@10%  
Ives.....60¢@10%  
Shepardson's.....45¢@10%  
45¢@10%  
45¢@10%

**Hollow Augers—**

Bonney's Adjustable,  $\frac{1}{2}$  doz \$48.....50¢  
Cincinnati Adjustable.....25¢@10%  
Cincinnati Standard.....25¢@10%  
Douglases.....33¢@33¢@10%  
French, Swift & Co. (Beecher).....33¢@33¢@10%  
Ives'.....33¢@33¢@10%  
Ives' Expansive, each \$4.50.....60¢  
Stearns'.....20¢  
Universal Expansive, each \$4.50.....20¢  
Wood's,  $\frac{1}{2}$  doz. \$48.....20¢

**Ship Augers and Bits—**

L'Hommedieu's.....15¢@10%  
Snell's.....25¢@10%  
Snell's Ship Auger Pattern Car Bits.....15¢@10%  
Watrous'.....25¢@10%

**Awl Hafts—See Hafts, Awl.****Awls—**

Brad, Handled..... $\frac{1}{2}$  gr. \$2.50@3.00  
Brad, Shouldered..... $\frac{1}{2}$  gr. \$1.30@1.40  
Peg, Pat..... $\frac{1}{2}$  gr. \$3.50@3.80  
Peg, Should..... $\frac{1}{2}$  gr. \$1.50@1.55  
Scratch, Handled..... $\frac{1}{2}$  gr. \$4.00@4.50  
Scratch, Socket..... $\frac{1}{2}$  doz. \$1.10@1.20

**Awl and Tool Sets—See Sets, Awl and Tool.****Axes—**

First quality, best brands.....\$6.00@8.50  
First quality, other brands.....5.50@6.00  
Beveled ad 50¢ doz.

**Axle Grease—See Grease, Axle.****Axles—**

o. 1 Common.....3¢@3¢  
o. 2 Common.....4¢@4¢  
Nos. 7 to 14.....70¢  
Nos. 15 to 23.....47¢  
Nos. 19 to 22.....70¢  
Concord Axles, loose collar.....4¢@4¢  
Concord Axles, solid collar.....5¢@5¢  
Tubular Axles.....50¢

**Bag Holders—See Holders, Bag.****Balances—****Sash—**

Caldwell, low list.....30¢  
Pullman.....60¢

**Spring—**

Spring Balances.....40¢@40¢@10%  
No. 2000 20 30  
Chatillon,  $\frac{1}{2}$  doz.....\$0.80 0.95 1.75 net  
Chatillon Straight Balances.....40¢@10%  
Chatillon Circular Balances.....50¢@10%

**Barb Wire—See Wire, Barb.****Bars—****Crow—**

Cast Steel..... $\frac{1}{2}$  in 2 $\frac{1}{2}$ ¢@3¢  
Iron, Steel Points..... $\frac{1}{2}$  in 2 $\frac{1}{2}$ ¢@3¢

**Basins, Wash—**

Standard Fiberglass, No. 1, 10 $\frac{1}{2}$  in., \$1.80;  
12 inch, \$2.00; 15 $\frac{1}{2}$  inch, \$2.50; 15 inch,  
\$3.00.

**Beams, Scale—**

Scale Beams, list Jan. 12, '83. 60¢@10%  
Chatillon's No. 1.....60¢@10%  
Chatillon's No. 2.....60¢@10%  
Custer's.....33¢

**Beaters—Egg—**

Bryant's..... $\frac{1}{2}$  gross \$14.00  
Double (H. & R. Mfg. Co.),  $\frac{1}{2}$  gro., No. 0  
\$12.00; No. 1, \$15.00; No. 2, \$18.00  
Dover..... $\frac{1}{2}$  doz \$1.00@1.20  
Dover (Standard Co.)..... $\frac{1}{2}$  doz \$1.00  
Duplex (Standard Co.)..... $\frac{1}{2}$  doz \$1.00  
Duplex Extra Heavy (Standard Co.)..... $\frac{1}{2}$  doz \$2.50  
Easy (H. & R. Mfg. Co.)..... $\frac{1}{2}$  gro \$12.00  
Improved Acme (H. & R. Mfg. Co.)..... $\frac{1}{2}$  gro. \$9.00  
Silver & Co..... $\frac{1}{2}$  doz \$5.50  
Spiral..... $\frac{1}{2}$  gro \$4.25 @ \$4.50  
Triple (H. & R. Mfg. Co.)..... $\frac{1}{2}$  gro \$16.50

**Culinary—**

Keystone, P. D. & Co., Each, No. 1, \$1;  
No. 2, \$2.....20¢

**Bells—****Cow—**

Common Wrought.....60¢@10%  
Kentucky Durham.....70¢@10%  
Kentucky, Sargent's list.....70¢@10%  
Kentucky, "Star".....20¢@10%  
Texas Star.....50¢@10%  
Western, Sargent's list.....70¢@10%

**Door—**

Crank Brooks'.....50¢@10%  
Crank Cots'.....10¢  
Crank Connel's.....20¢@10%  
Gong, Abbe's.....33¢@10%  
Gong, Barton's.....40¢@10%  
Gong, Yankee.....45¢@10%  
Lever, R. & E. Mfg. Co.'s.....50¢@10%  
Lever, Sargent's.....60¢@10%  
Lever, Taylor's Bronzed or Plated, net  
Lever, Taylor's Japanned.....25¢@10%  
Pull, Brooks'.....50¢@10%

**Electric—**

Bigelow & Downe.....20¢@10%  
Wollensak's.....20¢@10%

**Hand—**

Extra Heavy Brass.....70¢@10%  
Light Brass.....70¢@10%  
Silver Chime.....33¢@10%  
White.....70¢  
Globe Cone's Patent.....35¢@10%

**Miscellaneous—**

Call.....45¢@50%  
Farm Bells..... $\frac{1}{2}$  doz \$2.50  
Steel Alloy Church and School Bells.....50¢

**Bellows—**

Blacksmiths'.....60¢@10%  
Bellows.....40¢@10%  
Molders'.....40¢@10%

**Belting, Rubber—**

Common Standard.....75¢@10%  
Extra.....60¢@10%  
Standard.....70¢@10%  
N.Y.B. & P. Co., Carbon.....60¢@10%  
N.Y.B. & P. Co., Double Diamond.....60¢  
N.Y.B. & P. Co., 1846 Para.....40¢@10%

**Bench Stops—See Stops, Bench****Benders and Upsetters,****Tire—**

Detroit Perfect Tire Bender 15¢@15¢@10%  
Green River Tire Benders and Upsetters.....20¢  
Stoddard's Lightning Tire Upsetters.....15¢

**Bits—**

Auger, Gimlet, Bit Stock Drills, &c.,  
see Augers and Bits.

**Bit Holders—See Holders.****Blind Adjusters—See Adjusters, Blind.****Blind Fasteners—See Fasteners, Blind.****Blind Staples—See Staples, Blind.****Blocks—**

Cleveland Block Co., Mal. Iron.....50¢@10%  
Moore's Novelty, Mal. Iron.....50¢@10%  
Sore Grip Steel Tackle Blocks. 25¢@25¢@10%  
See also Machines, Hoisting

**Bolts—****Carriage, Machine, &c.—**

Com. list June 10, '84.....80¢@10%  
Genuine Eagle, Norway, list Oct. '84.....80¢@10%  
Eagle, Norway, list Oct. '84.....80¢@10%  
Phila. pattern, list Oct. '74.....80¢  
R.B. & W., old list.....70¢  
Bolt Ends, list Jan. 1, 1890.....80¢@10%  
Machine, list Jan. 1, 1890.....80¢@10%

**Door and Shutter—**

Cast Iron Barrel Square.....75¢@10%  
Cast Iron Chain (Sargent's list).....65¢@10%  
Cast Iron Shutter Bolts.....75¢@10%  
Ives' Patent Door Bolts.....60¢@10%  
Wrought Barrel.....75¢@10%  
Wrt B. K. Flush Common.....60¢@10%  
Wrt B. Shutter Brass Knob.....50¢@10%  
Wrt Shutter, Sargent's list.....60¢@10%  
Wrt Shutter, all Iron, Stanley's.....66¢@70¢  
Wrought Square.....75¢@10%  
Wrt Sunk Flush, Sargent's list.....80¢@10%  
Wrt Sunk Flush, Stanley's list.....60¢@10%

**Stove and Plow—**

Plow.....60¢@10%  
Stove.....65¢@70%  
R. B. & W., Plow.....55¢

**Tire—**

Common, list Feb. 28, '83.....70¢@10%  
American Screw Company  
Norway, Phila., list Oct. 16, '84.....75¢  
Eagle, Phila., list Oct. 16, '84.....80¢  
Bay State, list Feb. 28, '83.....70¢  
Port Chester Bolt and Nut Company:  
Empire list Feb. 28, '83.....70¢  
Keystone, Philadel., list Oct. '84.....75¢  
Norway, Phila., list Oct. '84.....75¢  
R. B. & W., Philadel., list Oct. 16, '84.....80¢

**Borers, Tap—**

Common and Ring.....20¢@10%  
Lark's.....33¢@35¢  
Entomologist's Co.....33¢@35¢  
Ives' Tap Bore.....33¢@35¢

**Boring Machines—See Machines, Boring.****Bow Pins—See Pins, Bow.****Boxes, Letter—**

Tatum's.....40

**Boxes, Wagon—**

Per m.....24¢

**Boxes, Miter.**

Spilker's Excelstor, 3 in. \$7.50, 4 in.  
\$8.50, 5 in. \$13.00, 6 in. \$15.00.....20¢

**Braces—**

American Bit Brace and Tool Co.:  
Nos. 10, 12, 20.....60¢@10%  
Nos. 11, 21, 24, 27.....70¢@10%  
Nos. 22, 23, 25.....60¢@10%  
Nos. 13, 26, 37.....70¢@10%

Barker's Imp'd Plain.....75¢@10%  
Barker's Imp. Nickleled.....85¢@10%  
Ratchet.....75¢@10%  
Eclipse Ratchet.....80¢  
Globe Jawed.....40¢@10%  
Corner Brace.....40¢@10%  
Universal 8 in., \$2.10; 10 in. \$2.25  
Buffalo Ball.....\$1.10@1.15  
Barber's.....50¢@10%  
Bartholomew's.....50¢@10%  
Armstrong's.....50¢@10%  
Common Ball, American.....\$1.00@1.10  
Davis Patent.....60¢@10%  
Fray's Gunee Spotfords.....50¢@10%  
Fray's Nos. 70 to 120, 81 to 123, 207 to 414  
Ives' New Haven Novelty.....70¢@10%  
New Haven Ratchet.....60¢@10%  
Barber Ratchet.....60¢@10%  
Barber's.....60¢@10%  
Spotford.....60¢@10%  
P. S. & W. Co., Peck's Patent.....60¢  
Rose & Johnson.....50¢  
Saxton's.....75¢@10%  
Barker's Imp. Polished.....75¢@10%  
Barker's Imp. Nickleled.....85¢@10%  
Ratchet, Polished.....60¢@10%  
Ratchet, Nickleled.....40¢@10%  
Buffalo Ball.....net, \$1.10@1.15

**Brackets—**

Shelf, fancy.....70¢@10%  
Sargent's list.....70¢@10%  
Other makes at a wide range of prices.  
Shelf, plain.....85¢@70%  
Sargent's list.....80¢@10%  
Bradley Shelf Brackets.....70¢@10%

**Bright Wire Goods—See Wire.****Broilers—**

Henis Self, 1 inch.....9 10 9 11  
Basting, 1 per doz.....\$4.50 5.50 6.50  
Morgan Odorless..... $\frac{1}{2}$  doz. \$12.50  
New Haven.....50¢  
Queen City.....33¢  
Wire Goods Co.....65¢@10%

**Buckets, Well and Fire—**

See Pails, Galvanized.

**Bull Rings—See Rings, Bull.****Butcher's Cleavers—See Cleavers, Butcher's.****Butts—**

Cast Brass, Fast.....33¢@10%  
Cast Brass, Loose Joint.....33¢@10%  
Cast Brass, Tiebout's.....50¢  
Wrought Brass.....80¢@10%  
Fast Joint, Broad.....60¢@10%  
Fast Joint, Narrow.....60¢@10%

**Loose Joint.....**

Loose Joint, Japanned.....  
Loose Joint, Jap. with Acorns.....  
Loose Pin, Acorns.....75¢@10%  
Loose Pin, Acorns, Japanned.....@80¢  
Loose Pin, Acorns, Japanned,  
Plated Tips.....  
Mayer's Hinges.....  
Parliament Butts.....

**Wrought Steel—**

Fast Joint, Broad.....  
Fast Joint, Narrow.....  
Fast Joint, Lt. Narrow.....  
Inside Blind, Light.....  
Inside Blind, Broad.....  
Loose Joint, Broad.....  
Loose Pin.....  
Table Butts, Back Flaps, &c.....  
Bronzed Wrought Butts.....50¢@10%  
50¢@10%  
50¢@10%

**Cages, Bird—**

Hendryx Brass:  
3000, 5000, 1100 series.....10¢  
1200 series.....40¢  
200, 300, 600 and 900 series.....40¢@10%  
Hendryx Bronze:  
100, 300 series.....40¢@10%  
Hendryx Enameled.....40¢@10%

**Callipers—See Compasses.****Calks Toe—**

Burke's, One Prong, Blunt.....45¢@50¢  
Burke's, One Prong, Sharp.....55¢@60¢  
Burke's, Two Prong, Blunt.....55¢@60¢  
Burke's Two Prong, Sharp.....65¢@70¢  
Gautier, One Prong, Blunt.....55¢@60¢

**Can Openers—See Openers, Can.****Cans Milk—**

S. S. & Co.: 5-gal., \$3.00; 8-gal., \$4.40;  
10-gal., \$4.75 each.....40¢@10%

**Cans Oil—**

Galvanized Blue Band, 1 gal.,  $\frac{1}{2}$  doz. \$2.30  
Galvanized Blue Band, 5 gal., Tip-Top,  
doz. \$12.00  
Galvanized Blue Band, 5 g. Fusite,  
doz. \$3.00  
Glass Oil, Friend.....doz. \$2.75

**Caps—Percussion—**

Hicks & Goldmark's and Union Metall.  
Cartridge Co. 10¢  
Eley's E. B. 50¢@55¢  
Eley's D. W. 50¢@55¢  
E. B. G. 50¢@55¢  
E. L. Trimmer Edge, 1-10's.....47¢@50¢  
F. L. Waterproof, 1-10's.....35¢@37¢  
G. D. 27¢@30¢  
Musket, Waterproof, 1-10's.....50¢@55¢  
S. B. Genuine Imported.....45¢

**Primers—**

Berdan Primers, \$1.00.....2¢  
B. L. Caps (Sturges' Shells) \$1.00.....2¢  
All other Primers, \$1.20.....2¢

**Cards—**

Watson's Cotton, Wool, Horse and  
File, list January 28, 1891.....25¢

**Carpet Stretchers—**

See Stretchers, Carpet.

**Cartridges—**

B. B. Caps, Con. Ball, Swgd., \$1.85@1.90  
B. B. Caps, Round Ball.....\$1.60@1.65  
Blank Cartridges, except 22 and 32 cal.,  
Additional 10% to above discounts.  
Blank Cartridges, 22 cal., \$1.75.....35¢  
Blank Cartridges, 32 cal., \$3.50.....35¢  
Cent. Fire, Military and Sporting 15¢@25¢  
Cent. Fire, Pistol and Rifle.....25¢@25¢  
Primed Shells and Bullets.....15¢@25¢  
Rim Fire Cartridges.....50¢@25¢  
Rim Fire Military.....15¢@25¢

**Carpet Sweepers—**

See Sweepers, Carpet.

**Casters—**

Bed.....Brass.....55¢@55¢@10%  
Plate.....Others.....60¢@60¢@10%  
Shallow Socket.....40¢@10%  
Deep Socket.....40¢@10%  
Giant Truck Casters.....35¢  
Gwinner's Common Sense.....45¢@50¢  
Gwinner's Hercules.....45¢@50¢  
Martin's Patent (Phoenix).....45¢@10%  
Payson's Anti-friction.....70¢@10%  
Payson's Truck.....60¢@10%  
Socket Truck Casters.....50¢@10%  
Stationary Truck Casters.....50¢@10%  
Trucker's Patent, low list.....45¢  
Yale Casters, low list.....45¢  
Yale, Gem.....70¢

**Cattle Leaders—**

See Leaders, Cattle.

**Cement—****Chain—**

American Coll. in case lots,  
3-16 5-16 7-16 9-16 11-16  
\$7.60 5.30 4.45 3.50 3.65 3.50 3.40 3.35  
Less than case lots, add 1¢@4¢  
German Coll., list July 12, 1892.....60¢@50¢@10%

German Halter Chain, list July 12, 1892.....60¢@50¢@10%

Trace, Wagon and Fancy Chains,  
list revised May, 1893.....60¢@10%  
Barnes' Reinforced Sash.....60¢@10%  
Barnes' Victor Sash.....65¢  
Covert Halter.....60¢@10%  
Covert Heel Chain.....50¢@10%  
Covert Traces.....35¢@10%  
Jack Chain, Iron and Brass, list July  
10, 1893.....60¢@10%  
Onoda Halter Chain.....60¢@10%  
Pump Chain, Galvanized.....60¢@10%

5 ton lots.....\$100 @ \$5.50  
1-ton lots.....\$100 @ \$5.75  
500-lb. lots.....\$100 @ \$6.75  
Small lots from jobbers.....\$100 @ \$6.75

**Chalk—(at factory.)**

Blue, case lots.....gr 25¢; small lots.....40¢@80¢  
Red, case lots.....gr 20¢; small lots.....35¢@15¢  
White case lots.....gr 17¢; small lots.....32¢@42¢

See also Crayons.

**Chalk Lines—See Lines.****Checks, Door—**

Bardsley's ..... 20%  
 Unity ..... 50%  
**Chisels—**  
**Socket Framing and Firmer**  
 Mix.  
 Ohio Tool Co. .... 75¢ to 10¢ 80%  
 P. S. & W. ....  
 Withby .....  
 Buck Bros. .... 30%  
 Charles Buck. .... 30%  
 Douglass ..... 75¢ to 10¢ 10%  
 Merrill ..... 60¢ to 10¢ 80% 10%  
 L. & J. White. .... 80¢ to 80% 5%  
**Tanged and Miscellaneous.**  
 Buck Bros. .... 30%  
 Charles Buck. .... 30%  
 Butcher ..... \$4.75 to \$5.00 to 2  
 Spear & Jackson's ..... \$5 to 2  
 Tanged Firmer ..... 50¢ to 50¢ 10%  
 L. & J. White, Tanged ..... 25¢ 5%  
 Cold Chisels, fair quality, # 14 to 16

**Chucks—**

Beach Pat. .... each, \$8.00. .... 20%  
 Danbury ..... each, \$6.00, 90¢ to 30%  
 Graham Patent ..... 35%  
 Morse's Adjustable, each, \$7.00, 20¢ to 25%  
 Syracuse, Bal. Pat. .... 25%  
 Skinner Patent Chucks.  
 Combination Lathe Chucks ..... 40%  
 Drill Chucks ..... 25%  
 Independent Lathe Chucks ..... 20%  
 Planer Chucks ..... 20%  
 Universal Lathe Chucks ..... 40%  
 Union Mfg. Co. .... 40%  
 Combination ..... 40%  
 Independent ..... 40%  
 Universal ..... 40%  
 Victor ..... \$5.50, 25%

**Churns—**

McDonald Star Barrel Churn, each  
 6 gal., \$2.80; 10 gal., \$2.75; 15 gal.,  
 \$3.00; 20 gal., \$3.25.  
 Tiffin Union, each, 5 gal. \$3.25; 7 gal.,  
 \$3.75; 10 gal., \$4.25.

**Clamps—**

Adjustable, Cincinnati ..... 15¢ to 10%  
 Adjustable, Hammers ..... 15¢ to 15¢ 5%  
 Adjustable, Steam's ..... 30¢ to 30¢ 10%  
 Barnes' Machine Clamps ..... 35%  
 Cabinet, Sargent's ..... 70¢ to 10%  
 Carpenter's, Cincinnati ..... 25¢ to 10%  
 Carriage Makers, P. S. & W. Co. .... 40¢ to 10%  
 Carriage Makers, Sargent's ..... 75¢ to 75¢ 5%  
 Eberhard Mfg. Co. .... 40¢ to 40¢ 10%  
 Joiners' Clamps, Tatum's ..... 25¢ to 10%  
 B. I. Tool Co.'s Wrought Iron ..... 25%  
 Raw Clamps, see Vises, Saw Fillets  
 Steam's Malleable, with Wrought Iron  
 Screw ..... 75¢ to 75¢ 5%  
 Warner's ..... 40¢ to 40¢ 10% 5%

**Cleavers, Butchers—**

Beatty's ..... 40¢ to 40¢ 10%  
 Bradley's ..... 25¢ to 30%  
 Foster Bros. .... 30%  
 New Haven Edge Tool Co.'s ..... 30%  
 Nichols Bros. .... 30%  
 P. S. & W. .... 35¢ to 25¢ 35% 10%  
 Schutte, Lohoff & Co. .... 40¢ to 40¢ 5%  
 L. & J. White. .... 25%

**Clips—**

Baker Axle Clips ..... 25%  
 Norway Axle ..... 65¢ to 10% 2%  
 Norway Spring Bar Clips ..... 65¢ to 5% 2%  
 2d grade Norway Axle ..... 70%  
 Steel Felloe Clips ..... # 1, 4%  
 Superior Axle Clips ..... 70%  
 Wrought Iron Felloe Clips ..... # 1, 5%  
**Cloth and Netting, Wire—**  
 See Wire, &c.

**Cockeyes—**

Cockey Brass  
 Hardware List, 100 lbs. Kerosene, Lever  
 Bibbs, Racking, &c. .... 60¢ to 60¢ 10% 10%  
**Coffee Mills—See Mills, Coffee.**

**Collars, Dog—**

Brass, Pope & Stevens' List ..... 40%  
 Chapman Mfg. Company, new list ..... 40%  
 Embossed, Gilt, Pope & Stevens' List ..... 30¢ to 10%  
 Leather, Pope & Stevens' List ..... 40%  
 Medford Fancy Goods Co. .... 40¢ to 10% 50%

**Combs, Curry—**

American Curry Combs Co. .... 35¢ to 40%  
 Fitch's ..... 50¢ to 10¢ 50¢ to 10% 10%  
 Gibb's Magnetic ..... # doz., \$2.00  
 Kohler's Humane ..... # doz., \$1.75  
 Kohler's Magic Oscillating ..... # doz., \$2.00  
 Rubber, per doz., \$10.00. .... 25%

**Compasses, Dividers &c.**

Compasses, Calipers, Dividers, 70¢ to 10¢ 75%  
 Bemis & Co. Co.'s  
 Dividers ..... 65%  
 Calipers, Call's Patent Inside ..... 55%  
 Calipers, Double ..... 65%  
 Calipers, Inside or Outside ..... 65%  
 Calipers, Wing ..... 60%  
 Compasses ..... 50¢ to 5%  
 Excelsior ..... 50%  
 Starrett's  
 Combination Dividers ..... 25%  
 Lock Calipers and Dividers ..... 25%  
 Spring Calipers and Dividers ..... 25¢ to 10%  
 Stevens & Co.'s ..... 25¢ to 10%

**Coolers, Water—**

S. B. & Co.: 2 gal., \$3.40; 3 gal., \$4.00;  
 4 gal., \$4.50; 5 gal., \$5.00 each ..... 60%  
**Coopers' Tools—**  
 See Tools, Coopers.

**Cord—Sash—**

Braided, Crown Drab and Fancy, #  
 1, 55¢ ..... 30%  
 Braided, Crown White, # 1, 50¢ ..... 50%  
 Cable Laid Italian Sash ..... # 1, 19¢ to 20%  
 Common ..... # 1, 12¢ to 13%  
 Common ..... # 1, 12¢ to 13%  
 Egyptian, India Hemp, Braided ..... # 1, 11¢ to 12%  
 India Cable Laid Sash ..... # 1, 11¢ to 12%  
 Massachusetts, White ..... 22¢ to 24%  
 Ossawa Mills  
 Braided, Giant, Drab and Fancy, #  
 1, 55¢ ..... 30%  
 Braided, Giant, White, # 30¢ ..... 10%  
 Patent, good quality ..... # 1, 10¢ to 11%  
 Patent Russia Sash ..... # 1, 13¢ to 14%  
 Sash  
 Braided, Drab Cotton ..... # 1, 42¢  
 Braided, Italian Hemp ..... # 1, 40¢  
 Braided, Linen ..... # 1, 50¢  
 Braided, White Cotton ..... # 1, 37¢  
 Hemp Idem, Braided, White ..... 20%  
 Silver Lake  
 A quality, Drab, 55¢ ..... 25%  
 A quality, White, 50¢ ..... 25%  
 B quality, Drab, 35¢ ..... 10%  
 B quality, White, 30¢ ..... 10%  
 Bryan Spring, Extra Braided, Drab, 30¢  
 Bryan Spring, Extra Braided, White, 30¢  
 Tans Solid Braided  
 Economy, Drab ..... # 1, 27¢  
 Economy, White ..... # 1, 22¢

**Crackers, Nut—**

Japaned, # gro., \$30. .... 50%  
 Nickel Plated, # gro., \$30. .... 10%  
 Table (H. & B. Mfg. Co.) ..... 40%  
 Turner & Seymour Mfg. Co. .... 50%

**Cradles—**

White Crayons, # gross ..... 60¢ to 10% 5%  
 Cases, 100 gr., \$3.75 to \$4.25, at factory.  
 D. M. Steward Mfg. Co.:  
 Metal Workers' # gross, \$2.50, 20¢ to 25%  
 Railroad, # gross, 2.00, 20¢ to 25%  
 Rolling Mill, # gross, 2.50, 20¢ to 25%  
 Soapstone Pencils, # gross, 1.50, 20¢ to 25%  
 See also Chalk.

**Creamery Pails—See Pails.****Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

**Cutters—**

American ..... 30%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Enterprise ..... \$5 to \$10 25% 50% 80%  
 Nos. 10 12 22 32 42  
 Each ..... \$3 to \$4 50 66 115  
 Dixon's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Draw Cut, each:  
 Nos. 5 6 8  
 \$50 \$75 \$80 \$225 ..... 20¢ to 25%  
 Hale's, # doz. .... 11 12 13  
 Nos. .... \$27.00 \$38.00 \$45.00  
 Home No. 1, # doz. .... \$28.00 ..... 55¢ to 10%  
 Little Giant, # doz. .... 40¢ to 10% 50%  
 Nos. 305 310 312 320 322  
 \$35.00 \$48.00 \$44.00 \$72.00 \$68.00  
 Miles' Challenge, # doz. .... 45¢ to 45¢ 10%  
 Nos. 1 2 3 4  
 \$32.00 \$30.00 \$40.00  
 Triumph No. 505, # doz. .... \$21.00, 25¢ to 30%  
 Woodruff's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 100 150  
 \$15.00 \$18.00  
 Chadborn's Smoked Beef Cutter, # doz.,  
 \$68.00  
 Enterprise Beef Shavers ..... 20%  
**Slaw and Kraut—**  
 Tucker & Dorsey Mfg. Co.:  
 Kraut Cutters, 1 K. .... 40%  
 Slaw Cutters, 1 K. .... \$21.00  
 Slaw Cutters, 2 Knife, # gross ..... 30.00  
**Tobacco**  
 A. .... # doz., \$20.00, 40%  
 All Iron ..... # doz., \$4.25  
 Champion ..... 20¢ to 10% 30%  
 Nashua Lock Co.'s, # doz. .... \$18.00, 50¢ to 5%  
 National ..... # doz., \$21.00, 30%  
 Sargent's ..... # doz., \$24.00, 55¢ to 10%  
**Washer—**  
 Appleton's ..... # doz., \$16.00, 60¢ to 10%  
 Bonney's ..... # doz., 30¢ to 10%  
 Cincinnati ..... 25¢ to 10%  
 Johnson's ..... # doz., \$11.00, 35%  
 Penny's, # doz., Pol. \$14; Jap. \$16, 55%  
 Smith's Pat. .... # doz., \$12.00, 30¢ to 10% 10%

**Meat—**

American ..... 30%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Enterprise ..... \$5 to \$10 25% 50% 80%  
 Nos. 10 12 22 32 42  
 Each ..... \$3 to \$4 50 66 115  
 Dixon's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Draw Cut, each:  
 Nos. 5 6 8  
 \$50 \$75 \$80 \$225 ..... 20¢ to 25%  
 Hale's, # doz. .... 11 12 13  
 Nos. .... \$27.00 \$38.00 \$45.00  
 Home No. 1, # doz. .... \$28.00 ..... 55¢ to 10%  
 Little Giant, # doz. .... 40¢ to 10% 50%  
 Nos. 305 310 312 320 322  
 \$35.00 \$48.00 \$44.00 \$72.00 \$68.00  
 Miles' Challenge, # doz. .... 45¢ to 45¢ 10%  
 Nos. 1 2 3 4  
 \$32.00 \$30.00 \$40.00  
 Triumph No. 505, # doz. .... \$21.00, 25¢ to 30%  
 Woodruff's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 100 150  
 \$15.00 \$18.00  
 Chadborn's Smoked Beef Cutter, # doz.,  
 \$68.00  
 Enterprise Beef Shavers ..... 20%  
**Slaw and Kraut—**  
 Tucker & Dorsey Mfg. Co.:  
 Kraut Cutters, 1 K. .... 40%  
 Slaw Cutters, 1 K. .... \$21.00  
 Slaw Cutters, 2 Knife, # gross ..... 30.00  
**Tobacco**  
 A. .... # doz., \$20.00, 40%  
 All Iron ..... # doz., \$4.25  
 Champion ..... 20¢ to 10% 30%  
 Nashua Lock Co.'s, # doz. .... \$18.00, 50¢ to 5%  
 National ..... # doz., \$21.00, 30%  
 Sargent's ..... # doz., \$24.00, 55¢ to 10%  
**Washer—**  
 Appleton's ..... # doz., \$16.00, 60¢ to 10%  
 Bonney's ..... # doz., 30¢ to 10%  
 Cincinnati ..... 25¢ to 10%  
 Johnson's ..... # doz., \$11.00, 35%  
 Penny's, # doz., Pol. \$14; Jap. \$16, 55%  
 Smith's Pat. .... # doz., \$12.00, 30¢ to 10% 10%

**Crayons—**

White Crayons, # gross ..... 60¢ to 10% 5%  
 Cases, 100 gr., \$3.75 to \$4.25, at factory.  
 D. M. Steward Mfg. Co.:  
 Metal Workers' # gross, \$2.50, 20¢ to 25%  
 Railroad, # gross, 2.00, 20¢ to 25%  
 Rolling Mill, # gross, 2.50, 20¢ to 25%  
 Soapstone Pencils, # gross, 1.50, 20¢ to 25%  
 See also Chalk.

**Creamery Pails—See Pails.****Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

**Cutters—**

American ..... 30%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Enterprise ..... \$5 to \$10 25% 50% 80%  
 Nos. 10 12 22 32 42  
 Each ..... \$3 to \$4 50 66 115  
 Dixon's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Draw Cut, each:  
 Nos. 5 6 8  
 \$50 \$75 \$80 \$225 ..... 20¢ to 25%  
 Hale's, # doz. .... 11 12 13  
 Nos. .... \$27.00 \$38.00 \$45.00  
 Home No. 1, # doz. .... \$28.00 ..... 55¢ to 10%  
 Little Giant, # doz. .... 40¢ to 10% 50%  
 Nos. 305 310 312 320 322  
 \$35.00 \$48.00 \$44.00 \$72.00 \$68.00  
 Miles' Challenge, # doz. .... 45¢ to 45¢ 10%  
 Nos. 1 2 3 4  
 \$32.00 \$30.00 \$40.00  
 Triumph No. 505, # doz. .... \$21.00, 25¢ to 30%  
 Woodruff's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 100 150  
 \$15.00 \$18.00  
 Chadborn's Smoked Beef Cutter, # doz.,  
 \$68.00  
 Enterprise Beef Shavers ..... 20%  
**Slaw and Kraut—**  
 Tucker & Dorsey Mfg. Co.:  
 Kraut Cutters, 1 K. .... 40%  
 Slaw Cutters, 1 K. .... \$21.00  
 Slaw Cutters, 2 Knife, # gross ..... 30.00  
**Tobacco**  
 A. .... # doz., \$20.00, 40%  
 All Iron ..... # doz., \$4.25  
 Champion ..... 20¢ to 10% 30%  
 Nashua Lock Co.'s, # doz. .... \$18.00, 50¢ to 5%  
 National ..... # doz., \$21.00, 30%  
 Sargent's ..... # doz., \$24.00, 55¢ to 10%  
**Washer—**  
 Appleton's ..... # doz., \$16.00, 60¢ to 10%  
 Bonney's ..... # doz., 30¢ to 10%  
 Cincinnati ..... 25¢ to 10%  
 Johnson's ..... # doz., \$11.00, 35%  
 Penny's, # doz., Pol. \$14; Jap. \$16, 55%  
 Smith's Pat. .... # doz., \$12.00, 30¢ to 10% 10%

**Crackers, Nut—**

Japaned, # gro., \$30. .... 50%  
 Nickel Plated, # gro., \$30. .... 10%  
 Table (H. & B. Mfg. Co.) ..... 40%  
 Turner & Seymour Mfg. Co. .... 50%

**Cradles—**

White Crayons, # gross ..... 60¢ to 10% 5%  
 Cases, 100 gr., \$3.75 to \$4.25, at factory.  
 D. M. Steward Mfg. Co.:  
 Metal Workers' # gross, \$2.50, 20¢ to 25%  
 Railroad, # gross, 2.00, 20¢ to 25%  
 Rolling Mill, # gross, 2.50, 20¢ to 25%  
 Soapstone Pencils, # gross, 1.50, 20¢ to 25%  
 See also Chalk.

**Crayons—**

White Crayons, # gross ..... 60¢ to 10% 5%  
 Cases, 100 gr., \$3.75 to \$4.25, at factory.  
 D. M. Steward Mfg. Co.:  
 Metal Workers' # gross, \$2.50, 20¢ to 25%  
 Railroad, # gross, 2.00, 20¢ to 25%  
 Rolling Mill, # gross, 2.50, 20¢ to 25%  
 Soapstone Pencils, # gross, 1.50, 20¢ to 25%  
 See also Chalk.

**Creamery Pails—See Pails.****Crow Bars—See Bars, Crow.****Curry Combs—**

See Combs, Curry.

**Cutters—**

American ..... 30%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Enterprise ..... \$5 to \$10 25% 50% 80%  
 Nos. 10 12 22 32 42  
 Each ..... \$3 to \$4 50 66 115  
 Dixon's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
 Draw Cut, each:  
 Nos. 5 6 8  
 \$50 \$75 \$80 \$225 ..... 20¢ to 25%  
 Hale's, # doz. .... 11 12 13  
 Nos. .... \$27.00 \$38.00 \$45.00  
 Home No. 1, # doz. .... \$28.00 ..... 55¢ to 10%  
 Little Giant, # doz. .... 40¢ to 10% 50%  
 Nos. 305 310 312 320 322  
 \$35.00 \$48.00 \$44.00 \$72.00 \$68.00  
 Miles' Challenge, # doz. .... 45¢ to 45¢ 10%  
 Nos. 1 2 3 4  
 \$32.00 \$30.00 \$40.00  
 Triumph No. 505, # doz. .... \$21.00, 25¢ to 30%  
 Woodruff's, # doz. .... 40¢ to 40¢ 5%  
 Nos. 100 150  
 \$15.00 \$18.00  
 Chadborn's Smoked Beef Cutter, # doz.,  
 \$68.00  
 Enterprise Beef Shavers ..... 20%  
**Slaw and Kraut—**  
 Tucker & Dorsey Mfg. Co.:  
 Kraut Cutters, 1 K. .... 40%  
 Slaw Cutters, 1 K. .... \$21.00  
 Slaw Cutters, 2 Knife, # gross ..... 30.00  
**Tobacco**  
 A. .... # doz., \$20.00, 40%  
 All Iron ..... # doz., \$4.25  
 Champion ..... 20¢ to 10% 30%  
 Nashua Lock Co.'s, # doz. .... \$18.00, 50¢ to 5%  
 National ..... # doz., \$21.00, 30%  
 Sargent's ..... # doz., \$24.00, 55¢ to 10%  
**Washer—**  
 Appleton's ..... # doz., \$16.00, 60¢ to 10%  
 Bonney's ..... # doz., 30¢ to 10%  
 Cincinnati ..... 25¢ to 10%  
 Johnson's ..... # doz., \$11.00, 35%  
 Penny's, # doz., Pol. \$14; Jap. \$16, 55%  
 Smith's Pat. .... # doz., \$12.00, 30¢ to 10% 10%

**Crackers, Nut—**

Japaned, # gro., \$30. .... 50%  
 Nickel Plated, # gro., \$30. .... 10%  
 Table (H. & B. Mfg. Co.) ..... 40%  
 Turner & Seymour Mfg. Co. .... 50%

**Cradles—**

White Crayons, # gross ..... 60¢ to 10% 5%  
 Cases, 100 gr., \$3.75 to \$4.25, at factory.  
 D. M. Steward Mfg. Co.:  
 Metal Workers' # gross, \$2.50, 20¢ to 25%  
 Railroad, # gross, 2.00, 20¢ to 25%  
 Rolling Mill, # gross, 2.50, 20¢ to 25%  
 Soapstone Pencils, # gross, 1.50, 20¢ to 25%  
 See also Chalk.

**Crayons—**

White Crayons, # gross ..... 60¢ to 10% 5%  
 Cases, 100 gr., \$3.75 to \$4.25, at factory.  
 D. M. Steward Mfg. Co.:  
 Metal Workers' # gross, \$2.50, 20¢ to 25%  
 Railroad, # gross, 2.00, 20¢ to 25%  
 Rolling Mill, # gross, 2.50, 20¢ to 25%  
 Soapstone Pencils, # gross, 1.50, 20¢ to 25%  
 See also Chalk.

**Creamery Pails—See Pails.****Crow Bars—See Bars, Crow.****Curry Combs—**

**Halters—**

Covert's Adj. Rope Halters.....	40x25
Covert's Adj. Web Halters.....	35x25x25
Covert's Hemp Horse and Cattle Ties.....	50x10x25
Covert's Jute Cattle Ties.....	70x10x25
Covert's Jute Horse Ties.....	70x25
Covert's Rope, 7-16-in. Jute.....	70x25
Covert's Rope, 1/4-in. Hemp.....	50x25
Covert's Rope, Jute.....	60x10x10x25
Covert's Saddlery Works Halters.....	35x25
Covert's Saddlery Works Handy Web Halters.....	35x25
Covert's Saddlery Works Horse and Cattle Ties.....	35x25

**Hammers—****Handled Hammers—**

Atha Tool Co.....	
Buffalo Hammer Co.....	50x10x60x
Hudson & Beckley.....	
Verco.....	
Cheney's Claw.....	40x10x
Cheney's Machinists' & Riveting.....	50x25
O. Hammond & Son.....	40x10x50x
Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....	80x10x
Maydole's, List Dec. 1, '85.....	25x10x35x
Peck, Stow & Wilcox.....	40x40x50x
Fayette R. Plumb.....	
Artisan's Choice, A. E. Nail.....	40x10x
Riveting, Engineers' and B. S. Hand.....	60x
Machinists' Hammers.....	80x10x
Regular Y. & P. A. E. Nail.....	60x
Other Hammers.....	40x10x50x
Sargent's.....	40x10x50x
Warner & Nobles, new list.....	25x10

**Heavy Hammers and Sledges—**

3 lb and under.....	80x30x10x
3 to 5 lb.....	80x30x10x
Over 5 lb.....	10x10x10x
Wilkinson's Smiths.....	10x10x10x

**Handcuffs and Leg Irons—****Handes—****Cross-Cut Saw Handles—**

Atkins.....	40x
Champion.....	15x
Ely's Perfection.....	50x
Sensible, per doz. Pr.....	50x50x10x

**Iron, Wrought or Cast—**

Barn Door, per doz.....	20x25
Bronze Iron Drop Latches.....	10x70x10x
Chest and Lifting.....	70x10x75x
Door or Thumb.....	
Nos. 1, 2, 3, 4.....	1.00 1.08 1.35 1.50
Per doz.....	60x10x10x70x
Jap'd Store Door Handles—Nuts, 1.10; Plate, 1.10; no plate, 0.88.....	10x
Roggin's Latches.....	25x30x30x

**Wood—**

Auger, assorted.....	gr 5.00
Auger, large.....	gr 7.00
File, assorted.....	gr 2.75
Brad Axl.....	gr 2.00
Apple Firmer Chisel, large.....	gr 6.00
Apple Firmer Chisel, small.....	gr 4.50
Hickory Firmer Chisel, large.....	gr 5.00
Hickory Firmer Chisel, small.....	gr 3.00
Socket Firmer Chisel, ass'd.....	gr 5.00
Socket Framing Chisel, ass'd.....	gr 5.00
Chisel, Fibre Head.....	35x25
Hammer, H. & S.....	60x60x50x
Hoe, Rake, Shovel, &c.....	set 1.25
Pat. Auger, Douglass.....	30x10x
Pat. Auger, Ives.....	30x10x
Pat. Auger, Swan's.....	set 1.00
Saw and Plane.....	40x10x50x
J. B. Smith & Co.'s Pat. File.....	50x

**Hangers—**

Barn Door, New England.....	70x70x25x
Barn Door, old pattern.....	70x70x25x
Barry.....	60x10x60x10x50x
Best Anti-Friction.....	60x10x60x10x50x
Boss.....	60x10x60x10x50x
Carrier Steel Anti-Friction.....	60x10x
Champion.....	60x10x
Chicago Anti-Friction.....	60x10x
Climax Anti-Friction.....	65x
Cincinnati Nos. 1, 2, 2.25; 3, 2.50; 4, 3.50.....	

Crescent.....	60x60x10x
Cronk's Patent, Steel Covered.....	60x10x
Duplex (Wood Track).....	60x10x
Economy, 26.00.....	60x10x
Hamilton Wrought Steel Track.....	55x
Interstate.....	50x10x60x
Kiddler's.....	50x10x10x
Lane's New Standard.....	50x50x25x
Lane's Parlor.....	40x40x50x
Lane's Standard.....	50x50x50x
Lundy, Steel Parlor.....	40x
Magie.....	45x10x
Matchless.....	50x10x
Moody.....	45x
Moore's Baggage Car Door.....	35x25
Moore's Elevator.....	35x25
Moore's Railroad.....	35x25
Nickel, Steel, Nos. 0, 25; 1, 30; 2, 35.....	40x10x50x

Orleans Steel.....	55x
Paragon Nos. 5, 5 1/2, 7 and 8.....	20x10x
Pendulum, Payson's.....	40x40x10x
Perfection.....	50x10x60x10x50x
Richards.....	30x30x10x
Samson Steel Anti-Friction.....	55x
Star.....	40x10x40x10x25x
Stearns' Anti-Friction.....	30x10x10x
Stearns' Challenge.....	25x10x10x
Sterling.....	50x10x60x
Terry's Ideal.....	60x10x60x10x50x
Terry's Modern.....	50x10x60x10x50x
Terry's Shield.....	50x10x60x
Terry's Solid.....	50x10x60x
Terry's Wrought Single Strap.....	50x10x
Victor, No. 1, 1.50; No. 2, 1.65; No. 3, 1.80.....	60x25x
Warner's Pat.....	20x10x10x
Wild West.....	45x10x
Zenith for Wood Track.....	55x

**Harness Snaps—See Snaps.****Hatchets—**

American Axe and Tool Co.....	
Blood's.....	
Hunt's.....	
Hurd's.....	40 & 10
Mann's.....	50x
Underhill's.....	
O. Hammond & Son.....	
Fayette R. Plumb.....	
Collins.....	10x
Buffalo Hammer Co.....	
Kelly's.....	50 & 50
S. & W. Co.....	210x
Sargent's & Co.....	
Shulte, Lohr & Co.....	
Ten Eyck Edge Tool Co.....	

**Hay and Straw Knives****See Knives.****Hinges—****Blind Hinges—**

Clark's.....	
Nos. 1, 3, 5, 1883, Old Pattern.....	75x10x10x
Nos. 1 and 3, Tip Pattern.....	75x10x10x
No. 50 Buffalo Noiseless, 40, 60 and 65.....	75x
Buffalo Reversible, Nos. 3, 2, 1 1/2, 1 and 0.....	75x50x
No. 1, Cottage, for wood only.....	80x10x
No. 1, Diamond, for wood only.....	80x10x
Dirle L. & P., Nos. 3, 2 1/2, 2, 1 1/2, 1, 0, 0, 4 and 5.....	75x50x
No. 25, Empire Reversible.....	75x10x10x
Lull & Porter, Nos. 3, 2 1/2, 2, 1 1/2, 1, 0, 0, 4 and 5.....	75x10x25x
Mortise Gravity, Nos. 2, 4, 4 1/2, 6, 8, 9 and 10.....	50x60x10x
Huffer.....	50x60x10x
Parker.....	75x10x
North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....	10x
Reading's Gravity.....	75x10x75x10x50x
Sargent's Nos. 1, 3, 5, 11, 12, 13.....	75x10x75x10x50x

Shepard's.....	
Acme, Lull & Porter, Nos. 3, 2 1/2, 2, 1 1/2, 1, 0, 0, 4 and 5.....	75x50x
Buffalo Gravity Locking, Nos. 1, 3 and 5.....	80x10x
Champion Gravity Locking, No. 75.....	80x10x
Clark's or Shepard's 1883, Old Pattern, Nos. 1, 3 and 5.....	75x10x50x
Clark's or Shepard's Tip Pattern, Nos. 1, 3 and 5.....	75x10x50x
Double Locking, Nos. 20 and 25.....	70x60x
Empire, Nos. 101 and 103.....	75x50x
Niagara Gravity Locking, Nos. 3 and 5.....	80x50x
Noiseless, Nos. 50, 60, 65 and 55.....	75x
O. S. Lull & Porter, Nos. 3, 2 1/2, 2, 1 1/2, 1, 0, 0, 4 and 5.....	75x10x25x
Pioneer, Nos. 060, 45 and 54.....	75x
Steamboat Gravity Locking No. 10.....	80x10x

**Gate Hinges—**

Automatic.....	per doz \$12.50, 50x
Clark's, Nos. 1, 2, 3.....	60x10x60x10x50x
N. E.....	per doz \$7.80, 60x60x10x
N. E. Reversible.....	per doz \$5.60, 60x60x10x
N. Y. State.....	per doz \$4.90, 60x60x10x
Shepard's Nos. 1, 2, 3.....	60x10x60x10x50x
Western.....	per doz \$4.20, 60x60x10x

**Spring Hinges—**

Acme.....	30x
American.....	20x
Bardsley's Patent Checking.....	15x
Barker's Double Acting.....	25x
Bommer's Japanned.....	35x
Bommer's All other Kinds.....	30x
Blackman's.....	15x25x
Champion.....	60x
Chicago.....	30x
Columbia.....	per gross, \$10.00
Crown.....	20x
Devore, No. 1.....	per gro, \$13.00
Freeport.....	per gro, \$12.00
See's Spring and Blank Butts.....	40x
Gem.....	20x
Ideal No. 3.....	per gross \$8.00
J. G. C Covered, per gro.....	\$30.00 50x25x
Knoxall.....	per gross, \$12.00
New Idea No. 1.....	per gross, \$10.00
New Idea No. 2.....	per gross, \$18.00
No. 10 Matchless.....	45x
No. 25 Unbreakable.....	60x
Oxford.....	20x
Reliable.....	per gro, \$13.00
Royal.....	per gross, 60x25x
Stearns' Noiseless Floor Hinges.....	75x
Surprise.....	set \$5.00..... 20x10x30x
Union Mfg. Co.....	per gross, \$12.00
Union Spring Hinge Co.'s list, March, 1885.....	20x
Wiles' No. 1, per gro, \$16; No. 2, \$13.....	40x

**Wrought Iron Hinges—**

Corrug'd Strap and T.....	60x10x60x10x50x
Strap and T List May 22, 1891.....	
Plate Hinges; 8, 10 & 12 in.....	50x
"Providence" over 12 in.....	40x
Roll'd Blind Hinges, Nos. 32 and 34.....	50x10x
Roll'd Blind Hinges, Nos. 232 and 234.....	55x10x
Roll'd Plate.....	70x10x
Roll'd Raised.....	70x10x
Screw Hook and Eye.....	1/4 in. 7x; 1/2 in. 8x; 3/4 in. 9x; 1 in. 10x; 1 1/4 in. 12x; 1 3/4 in. 14x; 2 in. 16x; 2 1/4 in. 18x; 2 3/4 in. 20x; 3 in. 22x; 3 1/4 in. 24x; 3 3/4 in. 26x; 4 in. 28x; 4 1/4 in. 30x; 4 3/4 in. 32x; 5 in. 34x; 5 1/4 in. 36x; 5 3/4 in. 38x; 6 in. 40x; 6 1/4 in. 42x; 6 3/4 in. 44x; 7 in. 46x; 7 1/4 in. 48x; 7 3/4 in. 50x; 8 in. 52x; 8 1/4 in. 54x; 8 3/4 in. 56x; 9 in. 58x; 9 1/4 in. 60x; 9 3/4 in. 62x; 10 in. 64x; 10 1/4 in. 66x; 10 3/4 in. 68x; 11 in. 70x; 11 1/4 in. 72x; 11 3/4 in. 74x; 12 in. 76x; 12 1/4 in. 78x; 12 3/4 in. 80x; 13 in. 82x; 13 1/4 in. 84x; 13 3/4 in. 86x; 14 in. 88x; 14 1/4 in. 90x; 14 3/4 in. 92x; 15 in. 94x; 15 1/4 in. 96x; 15 3/4 in. 98x; 16 in. 100x; 16 1/4 in. 102x; 16 3/4 in. 104x; 17 in. 106x; 17 1/4 in. 108x; 17 3/4 in. 110x; 18 in. 112x; 18 1/4 in. 114x; 18 3/4 in. 116x; 19 in. 118x; 19 1/4 in. 120x; 19 3/4 in. 122x; 20 in. 124x; 20 1/4 in. 126x; 20 3/4 in. 128x; 21 in. 130x; 21 1/4 in. 132x; 21 3/4 in. 134x; 22 in. 136x; 22 1/4 in. 138x; 22 3/4 in. 140x; 23 in. 142x; 23 1/4 in. 144x; 23 3/4 in. 146x; 24 in. 148x; 24 1/4 in. 150x; 24 3/4 in. 152x; 25 in. 154x; 25 1/4 in. 156x; 25 3/4 in. 158x; 26 in. 160x; 26 1/4 in. 162x; 26 3/4 in. 164x; 27 in. 166x; 27 1/4 in. 168x; 27 3/4 in. 170x; 28 in. 172x; 28 1/4 in. 174x; 28 3/4 in. 176x; 29 in. 178x; 29 1/4 in. 180x; 29 3/4 in. 182x; 30 in. 184x; 30 1/4 in. 186x; 30 3/4 in. 188x; 31 in. 190x; 31 1/4 in. 192x; 31 3/4 in. 194x; 32 in. 196x; 32 1/4 in. 198x; 32 3/4 in. 200x; 33 in. 202x; 33 1/4 in. 204x; 33 3/4 in. 206x; 34 in. 208x; 34 1/4 in. 210x; 34 3/4 in. 212x; 35 in. 214x; 35 1/4 in. 216x; 35 3/4 in. 218x; 36 in. 220x; 36 1/4 in. 222x; 36 3/4 in. 224x; 37 in. 226x; 37 1/4 in. 228x; 37 3/4 in. 230x; 38 in. 232x; 38 1/4 in. 234x; 38 3/4 in. 236x; 39 in. 238x; 39 1/4 in. 240x; 39 3/4 in. 242x; 40 in. 244x; 40 1/4 in. 246x; 40 3/4 in. 248x; 41 in. 250x; 41 1/4 in. 252x; 41 3/4 in. 254x; 42 in. 256x; 42 1/4 in. 258x; 42 3/4 in. 260x; 43 in. 262x; 43 1/4 in. 264x; 43 3/4 in. 266x; 44 in. 268x; 44 1/4 in. 270x; 44 3/4 in. 272x; 45 in. 274x; 45 1/4 in. 276x; 45 3/4 in. 278x; 46 in. 280x; 46 1/4 in. 282x; 46 3/4 in. 284x; 47 in. 286x; 47 1/4 in. 288x; 47 3/4 in. 290x; 48 in. 292x; 48 1/4 in. 294x; 48 3/4 in. 296x; 49 in. 298x; 49 1/4 in. 300x; 49 3/4 in. 302x; 50 in. 304x; 50 1/4 in. 306x; 50 3/4 in. 308x; 51 in. 310x; 51 1/4 in. 312x; 51 3/4 in. 314x; 52 in. 316x; 52 1/4 in. 318x; 52 3/4 in. 320x; 53 in. 322x; 53 1/4 in. 324x; 53 3/4 in. 326x; 54 in. 328x; 54 1/4 in. 330x; 54 3/4 in. 332x; 55 in. 334x; 55 1/4 in. 336x; 55 3/4 in. 338x; 56 in. 340x; 56 1/4 in. 342x; 56 3/4 in. 344x; 57 in. 346x; 57 1/4 in. 348x; 57 3/4 in. 350x; 58 in. 352x; 58 1/4 in. 354x; 58 3/4 in. 356x; 59 in. 358x; 59 1/4 in. 360x; 59 3/4 in. 362x; 60 in. 364x; 60 1/4 in. 366x; 60 3/4 in. 368x; 61 in. 370x; 61 1/4 in. 372x; 61 3/4 in. 374x; 62 in. 376x; 62 1/4 in. 378x; 62 3/4 in. 380x; 63 in. 382x; 63 1/4 in. 384x; 63 3/4 in. 386x; 64 in. 388x; 64 1/4 in. 390x; 64 3/4 in. 392x; 65 in. 394x; 65 1/4 in. 396x; 65 3/4 in. 398x; 66 in. 400x; 66 1/4 in. 402x; 66 3/4 in. 404x; 67 in. 406x; 67 1/4 in. 408x; 67 3/4 in. 410x; 68 in. 412x; 68 1/4 in. 414x; 68 3/4 in. 416x; 69 in. 418x; 69 1/4 in. 420x; 69 3/4 in. 422x; 70 in. 424x; 70 1/4 in. 426x; 70 3/4 in. 428x; 71 in. 430x; 71 1/4 in. 432x; 71 3/4 in. 434x; 72 in. 436x; 72 1/4 in. 438x; 72 3/4 in. 440x; 73 in. 442x; 73 1/4 in. 444x; 73 3/4 in. 446x; 74 in. 448x; 74 1/4 in. 450x; 74 3/4 in. 452x; 75 in. 454x; 75 1/4 in. 456x; 75 3/4 in. 458x; 76 in. 460x; 76 1/4 in. 462x; 76 3/4 in. 464x; 77 in. 466x; 77 1/4 in. 468x; 77 3/4 in. 470x; 78 in. 472x; 78 1/4 in. 474x; 78 3/4 in. 476x; 79 in. 478x; 79 1/4 in. 480x; 79 3/4 in. 482x; 80 in. 484x; 80 1/4 in. 486x; 80 3/4 in. 488x; 81 in. 490x; 81 1/4 in. 492x; 81 3/4 in. 494x; 82 in. 496x; 82 1/4 in. 498x; 82 3/4 in. 500x; 83 in. 502x; 83 1/4 in. 504x; 83 3/4 in. 506x; 84 in. 508x; 84 1/4 in. 510x; 84 3/4 in. 512x; 85 in. 514x; 85 1/4 in. 516x; 85 3/4 in. 518x; 86 in. 520x; 86 1/4 in. 522x; 86 3/4 in. 524x; 87 in. 526x; 87 1/4 in. 528x; 87 3/4 in. 530x; 88 in. 532x; 88 1/4 in. 534x; 88 3/4 in. 536x; 89 in. 538x; 89 1/4 in. 540x; 89 3/4 in. 542x; 90 in. 544x; 90 1/4 in. 546x; 90 3/4 in. 548x; 91 in. 550x; 91 1/4 in. 552x; 91 3/4 in. 554x; 92 in. 556x; 92 1/4 in. 558x; 92 3/4 in. 560x; 93 in. 562x; 93 1/4 in. 564x; 93 3/4 in. 566x; 94 in. 568x; 94 1/4 in. 570x; 94 3/4 in. 572x; 95 in. 574x; 95 1/4 in. 576x; 95 3/4 in. 578x; 96 in. 580x; 96 1/4 in. 582x; 96 3/4 in. 584x; 97 in. 586x; 97 1/4 in. 588x; 97 3/4 in. 590x; 98 in. 592x; 98 1/4 in. 594x; 98 3/4 in. 596x; 99 in. 598x; 99 1/4 in. 600x; 99 3/4 in. 602x; 100 in. 604x; 100 1/4 in. 606x; 100 3/4 in. 608x; 101 in. 610x; 101 1/4 in. 612x; 101 3/4 in. 614x; 102 in. 616x; 102 1/4 in. 618x; 102 3/4 in. 620x; 103 in. 622x; 103 1/4 in. 624x; 103 3/4 in. 626x; 104 in. 628x; 104 1/4 in. 630x; 104 3/4 in. 632x; 105 in. 634x; 105 1/4 in. 636x; 105 3/4 in. 638x; 106 in. 640x; 106 1/4 in. 642x; 106 3/4 in. 644x; 107 in. 646x; 107 1/4 in. 648x; 107 3/4 in. 650x; 108 in. 652x; 108 1/4 in. 654x; 108 3/4 in. 656x; 109 in. 658x; 109 1/4 in. 660x; 109 3/4 in. 662x; 110 in. 664x; 110 1/4 in. 666x; 110 3/4 in. 668x; 111 in. 670x; 111 1/4 in. 672x; 111 3/4 in. 674x; 112 in. 676x; 112 1/4 in. 678x; 112 3/4 in. 680x; 113 in. 682x; 113 1/4 in. 684x; 113 3/4 in. 686x; 114 in. 688x;



**Plate.**.....45¢  
**Romer's Night Latches**.....15¢  
**R. & E. Mfg. Co., list Mar. 30, 1893**.....60¢10¢70  
**Sargent & Co. Lds. Atg. 1, '88**.....60¢10¢70  
**Warner's Burglar Proof**.....1¢ doz. \$8.00, 50¢  
**Yale**.....net prices

**Elevator—**  
**Moore's**.....38¢

**Padlocks—**  
**Wrought Iron Padlocks:**

**Brittan, Graham & Mathes, list**  
**Jan. 1894**.....75¢  
**Mallory, Wheeler Co., list Jan. 1,**  
**1894**.....75¢  
**Norwich Lock Mfg. Co., list June**  
**10, 1891**.....50¢25¢  
**Russell & Erwin Mfg. Co., list June**  
**10, 1891**.....50¢25¢  
**Sargent & Co., list January 1, 1891**  
**75¢**  
**William Wilcox Mfg. Co., list Janu-**  
**ary 1, 1891**.....75¢20¢  
**Ames Sword Co. up to No. 103 incl.**  
**Ames Sword Co. above No. 103**.....50¢10¢  
**Barnes Mfg. Co., list June**.....40¢40¢10¢  
**Champion Padlocks**.....40¢  
**A. E. Deltz**.....40¢  
**Eagle**.....40¢  
**Eureka, Eagle Lock Co.**.....40¢25¢  
**E. T. Frahm's Keystone Scandinavian**  
**1010 line**.....90¢25¢  
**120 line**.....90¢25¢  
**109 line**.....65¢  
**610 line**.....70¢10¢  
**225, 610 and 209 lines**.....70¢  
**All other numbers**.....50¢5¢  
**Horseshoe**.....1¢ doz. \$9.50¢50¢10¢  
**Hotchkiss**.....30¢  
**No. 6**.....30¢  
**Romer's No. 6 to 91**.....30¢  
**Romer's Scandinavian, &c., Nos. 100 to**  
**505**.....15¢  
**Scandinavian**.....90¢50¢  
**Slaymaker, Barry & Co.**  
**No. 1010 line**.....90¢  
**No. 41 line**.....50¢  
**No. 61 line**.....60¢  
**No. 21 line**.....70¢  
**No. 109 line**.....90¢40¢  
**Star**.....60¢  
**Yale Lock Mfg. Co.'s**.....net prices

**Sash, &c.—**  
**Attwell Mfg. Co.**.....25¢38¢45¢  
**Champion Safety**.....1893.70¢55¢  
**Clark's No. 1, 10; No. 2, 3 gr.**.....33¢45¢  
**Common Sense, Jap'd, Cop'd and**  
**Brzd.**.....gr \$4.00  
**Common Sense, Nickel Plated**.....gr \$10.00

**Corbin's Daisy**.....list Feb. 15, 1893.....70¢  
**Davis Bronze Barnes Mfg. Co.**.....60¢  
**Ferguson's**.....33¢45¢  
**Fish (Liesche's pat.), No. 100, gr.**.....88¢  
**No. 105, gr.**.....10¢  
**Giant, list Jan. 1892**.....70¢10¢40¢  
**Hammond's Window Springs**.....40¢  
**Hugunin's New Sash Locks**.....25¢5¢25¢  
**Hugunin's Sash Balance**.....25¢5¢25¢  
**Ives Patent**.....60¢10¢25¢60¢10¢10¢  
**Kempshall's Gravity**.....60¢  
**Kempshall's Model**.....60¢60¢10¢  
**Monarch**.....50¢  
**Payson's Perfect**.....60¢10¢10¢  
**Reading**.....60¢10¢60¢10¢10¢  
**Security**.....70¢  
**Universal**.....30¢  
**Victor**.....60¢10¢25¢  
**Walker's**.....10¢  
**Wolcott's**.....60¢10¢5¢

**Lumber Tools—**  
**See Tools, Lumber.**

**Lustro—**  
**Four-ounce bottles**.....1¢ doz. \$1.75; 1¢  
**gross**.....\$17.00

**Machines.**

**Boring—**  
**Without Augers. Upright. Angular.**  
**Boss, Carpenters' 3.80**  
**Boss, Ship Bldrs' 3.85**  
**Douglas**.....\$5.50 6.75.....50¢  
**Jennings**.....5.50 6.75.....50¢50¢55¢  
**Millers Falls**.....7.50.....25¢  
**Phillips' Patent**  
**with Auger**.....7.00 7.50.....  
**Snell's, Rice's Pat 5.50 6.75.....40¢10¢10¢**

**Fluting—**  
**American, 5 in., \$3.00; 6 in., \$3.40; 7 in.,**  
**\$4.50 each**.....35¢  
**Combined Fluter and Sad Iron**.....30¢  
**Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in.,**  
**\$5.50 each**.....35¢  
**Crown Hand Fluter, Nos. 1, \$15.00; 2,**  
**\$12.50; 3, \$10.00; 4, \$8.25**.....\$5.00 each, 35¢  
**Crown Jewel, 6 in.**.....each, \$1.50  
**Domestic Fluter**.....\$2.15.....35¢  
**Eagle, 8 1/2 inch Rolls, \$2.85**.....35¢  
**Eagle, 6 1/2 inch Rolls, \$2.85**.....35¢  
**Knox, 4 1/2 inch Rolls, \$3.25 each**.....35¢  
**Knox, 6 inch Rolls, \$3.60 each**.....35¢

**Holisting—**  
**Moore's Anti-Friction Differential Pul-**  
**ley Block**.....20¢  
**Moore's Hand Hoist, with Lock Brake**.....20¢  
**Moore's Rope Differential Pulley**  
**Block**.....60¢  
**Marris & Beekley (Teal Patent)**.....30¢  
**See also Blocks.**

**Washing—**  
**Fair and Square**.....1¢ doz. \$42.00  
**Anthony Wayne**.....1¢ doz. \$42.00  
**2, 3, 4, No. 3, \$42**.....  
**Wayne American**.....1¢ doz. \$36.00  
**Well**.....1¢ doz. \$36.00  
**Western Star**.....1¢ doz. \$36.00  
**\$39**

**Mallets—**  
**B. & L. Block Co., Hickory & L. V.**  
**30¢10¢40¢**  
**Vibre Head, Stearns**.....33¢45¢  
**Hickory**.....20¢10¢20¢10¢10¢  
**Lignumvite**.....20¢10¢20¢10¢10¢

**Mattocks—Regular list.**  
**60¢10¢60¢10¢5¢**

**Measures—**  
**standard Fibreware, No. 1, peak**  
**dozen, \$3.50; 1/4 peak, \$3.00**

**Meat Cutters—**  
**See Cutters, Meat.**

**Menders—**  
**Harness**.....1¢ doz. \$1.75  
**Hudson's Hose Menders, in set, 1¢ doz.**  
**\$3.00**  
**Hudson's Hose Bands**.....gr. \$1.25

**Milk Cans—See Cans, Milk.**

**Mills—**  
**Coffee—**  
**Box and Side, list Jan. 1, 1888. 60¢10¢**  
**Net prices are often made which are**  
**lower than above discount.**  
**American, Enterprise Mfg. Co., list Jan.**  
**17, 1893**.....20¢  
**National List, Jan. 1, 1894**.....30¢  
**Swift, Lane Bros.**.....30¢  
**Waddell's New Box Mills, Ideal**  
**Brand, New List**.....60¢60¢10¢

**Mincing Knives—**  
**See Knives, Mincing.**

**Molasses Gates—**  
**See Gates, Molasses.**

**Money Drawers—**  
**See Drawers, Money.**

**Mowers, Lawn—**  
**Highest 10 in. 12 in. 14 in.**  
**grade, \$4.00 to \$5.25 \$4.50 to \$6.00 \$5.00 to \$6.75**  
**Good**.....\$3.00 \$3.25 \$5.50  
**Cheap**.....2.25 2.50 2.75

**Muzzles—**  
**Safety**.....1¢ doz. \$3.00, 25¢

**Nails—**  
**Cut and Wire. See Trade Report.**

**Wire Nails, Papered**  
**Association list, May 1, '92**.....85¢10¢  
**Hungarian, Finishing, Upholsterers', &c.**  
**See Tacks.**

**Horse—**  
**Nos. 6 7 8 9 10**  
**A. C.**.....25¢ 23¢ 22¢ 21¢ 20¢  
**American**.....9¢ 9¢ 9¢ 9¢ 9¢  
**Anchor**.....23¢ 21¢ 20¢ 19¢ 18¢  
**Ausable**.....28¢ 26¢ 25¢ 24¢ 23¢

**Capewell**.....19¢ 18¢ 17¢ 16¢ 15¢  
**C. B. K.**.....25¢ 23¢ 22¢ 21¢ 20¢  
**Champion**.....25¢ 23¢ 22¢ 21¢ 20¢  
**Champlain**.....28¢ 26¢ 25¢ 24¢ 23¢

**Clinton, Fin.**.....19¢ 17¢ 16¢ 15¢ 14¢  
**Empire Bronzed**.....11¢11¢  
**Essex**.....28¢ 26¢ 25¢ 24¢ 23¢

**Lyra**.....9¢ 9¢ 9¢ 9¢ 9¢  
**Maud S.**.....25¢ 23¢ 22¢ 21¢ 20¢

**Northwest'n**.....25¢ 23¢ 22¢ 21¢ 20¢

**Putnam**.....23¢ 21¢ 20¢ 19¢ 18¢  
**Snowden**.....9¢ 9¢ 9¢ 9¢ 9¢  
**Standard**.....23¢ 21¢ 20¢ 19¢ 18¢  
**Vulcan**.....23¢ 21¢ 20¢ 19¢ 18¢  
**Western**.....23¢ 21¢ 20¢ 19¢ 18¢

**Picture—**  
**Brass Head, Combination list**.....50¢10¢  
**Brass Head, Sargent's list**.....50¢10¢  
**Brass Head, Sargent's list**.....50¢10¢  
**Porcelain Head, Sargent's list**.....50¢10¢  
**Niles' Patent**.....40¢

**Nail Pullers—See Pullers, Nail.**

**Nail Sets—See Sets, Nail.**

**Nippers, See Pliers and Nippers**

**Nut Crackers—**  
**See Crackers, Nut.**

**Nuts—List Dec. 18, 1889.**

**Cold Punched**.....5.00¢ 5.10¢ off list  
**Hot Pressed**.....5.80¢ 6.00¢ off list  
**in packages of 100 lb, add 1-10¢ lb**  
**1/2¢ lb, net.**

**Oakum—**  
**Best or Government**.....1¢ 6¼¢63¢  
**Navy**.....1¢ 6¼¢63¢  
**U. S. Navy**.....1¢ 6¼¢63¢

**Oil Tanks—See Tanks, Oil.**

**Oilers—**  
**Brass and Copper**.....50¢10¢50¢10¢5¢  
**Zinc and Tin**.....70¢70¢10¢  
**Broughton's Brass**.....50¢  
**Broughton's Zinc**.....60¢  
**Malleable, Hammers' Improved, No. 1,**  
**\$3.80; No. 2, \$4.00; No. 3, \$4.40**.....doz.

**Malleable, Hammers' Old Pattern, same**  
**list**.....50¢  
**Olmstead's Brass and Copper**.....50¢  
**Olmstead's Tin and Zinc**.....60¢  
**Prior's Pat. or "Paragon" Brass**.....80¢  
**Prior's Pat. or "Paragon" Zinc**.....70¢  
**Steel, Trapper & Williams**.....50¢  
**W. Hot & Hobbs Mfg. Co. Steel Anti-**  
**Rust**.....60¢

**Openers, Can—**  
**American**.....gross \$1.75¢42.00  
**Champion**.....1¢ doz. \$2.00  
**Domestic**.....1¢ doz. \$2.00  
**Duplex**.....1¢ doz. \$2.00  
**Eureka**.....1¢ doz. \$2.00  
**Excelsior, No. 1**.....\$2.50; No. 2, \$1.50  
**French, No. 1**.....\$2.25, 55¢60¢  
**Iron Handle, No. 5**.....gr \$6.00, 45¢60¢  
**Lyman's**.....1¢ doz. \$3.75, 20¢  
**Messenger's Comet**.....1¢ doz. \$3.00, 25¢  
**Moore's**.....1¢ doz. \$2.50, 10¢  
**Sardine Sissors**.....1¢ doz. \$2.75¢3.00  
**Sprague, No. 1, 55¢; 2, 60¢; 3, 65¢**  
**Star**.....1¢ doz. \$2.75

**Streeter's:**  
**Sensible, Japanned, per doz.**.....60¢  
**Sensible, Nickel, per doz.**.....75¢  
**Surprise, per doz.**.....25¢  
**New Sprague, Metal, per doz.**.....50¢  
**New Sprague, Wood Handle, per doz.**.....60¢  
**Universal**.....1¢ doz. \$3.00  
**World's Best**.....gross, No. 1, \$12.00;  
**No. 2, \$24.00; No. 3, \$36.00**.....50¢10¢

**Packing, Steam—**  
**Rubber—**  
**Standard, fair quality**.....70¢10¢75¢  
**Inferior quality**.....75¢10¢80¢  
**Extra**.....60¢50¢10¢10¢5¢  
**Jenkins' Standard**.....1¢ 80¢  
**N. Y. B. & P. Co., Double Diamond**.....90¢  
**N. Y. B. & P. Co., Salsander**.....45¢  
**N. Y. B. & P. Co., Carbon**.....70¢5¢

**Miscellaneous—**  
**American Packing**.....9¢10¢10¢  
**Cotton Packing**.....14¢15¢  
**Italian Packing**.....12¢13¢  
**Jute**.....6¢7¢  
**Russia Packing**.....18¢14¢

**Pails—**  
**Creamery—**  
**S. S. & Co., 18-qt., \$7.00; 20-qt., \$7.25**  
**1¢ doz.**

**Galvanized Pails—**  
**Light. Heavy.**  
**10 Quart**.....\$2.00¢2.25 \$2.25¢2.50  
**12 Quart**.....2.25¢2.50 2.50¢2.75  
**14 Quart**.....2.50¢2.75 2.75¢3.00

**Galvanized Buckets—**  
**Fire. Well.**  
**10 Quart**.....\$2.50¢3.75  
**12 Quart**.....2.75¢3.00 \$2.25¢2.50  
**14 Quart**.....3.00¢3.25 2.50¢2.75

**Indurated Fiber Ware**  
**Fire Pails, deep**.....1¢ doz. \$4.80  
**Fire Pails, round bottom**.....1¢ doz. \$5.40  
**Milk, 14 qt.**.....1¢ doz. \$5.40  
**Stable, 14 qt.**.....1¢ doz. \$6.00  
**Star Pails, 12 qt.**.....1¢ doz. \$4.20

**Standard Fiber Ware—**  
**Plain. Decor'd**  
**Buggy Pails**.....\$3.00  
**Chamber Pails, 14 qt.**.....6.00 \$7.00  
**Dairy Pails, 14 qt., 1 doz.**.....3.75 4.25  
**Fire Pails, No. 1, 12 qt., 1 doz**.....3.75  
**Fire Pails, No. 2, 14 qt., 1 doz**.....4.25  
**Horse Pails, 4 qt.**.....4.00  
**Slop Jars (bal trap)**.....7.50 8.50  
**Sugar Pails**.....5.00 5.50  
**Water Pails, 12 qt., 1 doz**.....3.15 3.75

**Pans—**  
**Dripping—**  
**Large sizes**.....1¢ 5¢  
**Small sizes**.....1¢ 5¢  
**Silver & Co. (Covered)**.....40¢

**Fry—**  
**Standard List:**  
**No.**.....0 1 2 3 4  
**1¢ doz.**.....\$3.00 \$3.75 \$4.25 4.75 \$5.25  
**No.**.....0 1 2 3 4  
**1¢ doz.**.....\$6.00 \$7.00 \$8.00 \$9.00

**Polished, regular goods**.....75¢75¢10¢  
**Acme Fry Pans**.....66¢

**Dust—**  
**Steel Edge, No. 1**.....1¢ doz. \$1.75

**Roasting and Baking—**  
**Columbian, S. S. & Co., Nos. 10, \$2; 20,**  
**\$2.25; 30, \$2.50 each**.....60¢10¢

**Paper and Cloth—**  
**Sand and Emery—**  
**List April 19, 1888**.....60¢10¢60¢  
**Sibley's Emery and Crocus Cloth**.....30¢

**Parers—**  
**Apple—**  
**Advance**.....1¢ doz. \$4.25  
**Baldwin**.....1¢ doz. 4.75  
**Bonanza**.....each 5.00  
**Daisy**.....1¢ doz. 3.50  
**Daisy**.....each 7.50  
**Ellipse**.....1¢ doz. 4.00  
**Eureka, 1888**.....each 16.00  
**Family Bay State**.....1¢ doz. 12.00  
**Favorite**.....1¢ doz. 5.00  
**Gold Medal**.....1¢ doz. 4.00  
**Ideal**.....1¢ doz. 4.00  
**Little Bay State**.....1¢ doz. \$7.00¢8.75  
**Little Star**.....1¢ doz. 4.00  
**Monarch**.....1¢ doz. 13.50  
**New Lightning**.....1¢ doz. 5.50  
**Orion**.....1¢ doz. 4.00  
**Penn**.....1¢ doz. 3.00  
**Perfect**.....1¢ doz. 4.00  
**Reading 72**.....1¢ doz. 3.75  
**Reading 78**.....1¢ doz. 0.75  
**Rocking Table**.....1¢ doz. 5.50  
**Turn Table**.....1¢ doz. 4.50  
**Victor**.....1¢ doz. 13.50  
**Waverly**.....1¢ doz. 4.00  
**White Mountain**.....1¢ doz. 4.00

**Potato—**  
**Antrim Combination**.....1¢ doz. \$5.50  
**Saratoga**.....1¢ doz. \$5.50  
**White Mountain**.....1¢ doz. \$4.50

**Pencils, Soapstone—**  
**See Crayons.**

**Pickers, Fruit—**  
**Prize Fruit Pickers**.....50¢

**Picks—**  
**Railroad or Adze Eye, 5 to 6, \$12.00; 6**  
**to 7, \$13.00**.....60¢10¢10¢70¢

**Picture Nails—**  
**See Nails, Picture.**

**Pinking Irons—**  
**See Irons, Pinking.**

**Pins—**  
**Bow—**  
**Humason, Beekley & Co.'s**.....60¢10¢  
**Peck, Stow & W. Co.**.....50¢10¢50¢10¢5¢  
**Sargent & Co.'s, \$17 and \$18**.....60¢10¢

**Escutcheon—**  
**Brass**.....70¢  
**Iron, list Nov. 11, 1885**.....76¢

**Pipe, Wrought Iron—**  
**List April 13, 1893.**  
**1 1/2 and under, Plain**.....57¢10¢10¢10¢  
**1 1/2 and under, Galv.**.....50¢10¢10¢10¢  
**1 1/2 and over, Plain**.....67¢10¢10¢10¢  
**1 1/2 and over, Galv.**.....67¢10¢10¢10¢  
**Boiler Tubes, list Oct. 24, 1892**.....65¢10¢10¢10¢  
**Casing, list Nov. 16, 1892**.....52¢10¢10¢10¢  
**Cold Drawn Seamless Steel Tubing**.....50¢  
**Inserted Joints Casing, list Nov. 16,**  
**1892**.....47¢10¢10¢10¢  
**Steel Boiler Tubes**.....27¢10¢10¢5¢

**Planes and Plane Irons—**  
**Wood Planes—**  
**Molding**.....50¢10¢  
**Beckley, First quality**.....55¢10¢  
**Beckley, Second quality**.....60¢10¢10¢  
**Bailey's (Stanley R. & L. Co.)**.....50¢10¢

**Iron Planes—**  
**Bailey's (Stanley R. & L. Co.)**.....50¢10¢  
**Birmingham Plane Co.**.....50¢10¢50¢10¢10¢  
**Chaplin's Iron Planes**.....50¢10¢50¢10¢5¢  
**Davis' Iron Planes**.....50¢10¢50¢  
**Gage Tool Co.'s Self-Setting**.....35¢  
**Miscellaneous Planes (Stanley R. & L. Co.)**.....25¢10¢  
**Standard Tool Co.**.....50¢10¢10¢10¢10¢  
**Stearns' Iron Planes**.....50¢10¢50¢10¢5¢

**Plane Irons—**  
**Auburn Thistle**.....30¢10¢30¢10¢10¢  
**Buck Bros.**.....80¢  
**Butcher's**.....\$5.00¢\$5.25 to \$10.00  
**Ohio**.....30¢10¢30¢10¢10¢  
**Sandusky**.....  
**Stanley R. & L. Co.**.....50¢10¢  
**L. & J. White**.....25¢

**Plates—**  
**Pliers and Nippers—**  
**Butter's Patent**.....60¢  
**Carew's Pat. Wire Cutters**.....20¢  
**Cronk's 5 in., \$15.00; 10 in.**.....\$21. 60¢  
**Cronk's Button Pattern**.....60¢10¢5¢  
**Cronk's Carrier Pliers**.....60¢60¢5¢  
**Eureka Pliers and Nippers**.....40¢  
**Gas Pliers**.....60¢  
**Gas Pliers, Custer's Nickel Plated**.....25¢  
**Hall's No. 2, 5 in., \$13.50; No. 4, 7 in.,**  
**\$21.00**.....40¢10¢  
**Humason & Beekley Mfg. Co.**.....50¢50¢10¢  
**Lindsay's Giant, No. 55, 5 in., 1¢ doz.**  
**\$10.50**.....38¢  
**Morrill's Parallel**.....1¢ doz. \$12.00.....80¢45¢  
**P. S. & W. Cast Steel**.....50¢50¢45¢  
**P. S. & W. Tinner's Cutting Nippers**  
**add 6¢**.....10¢  
**Russell's Parallel**.....25¢

**Plumbs and Levels—**  
**Regular list**.....75¢10¢80¢  
**Cook's**.....40¢10¢  
**Davis Inclinometer**.....10¢40¢  
**Davis Iron Levels**.....50¢  
**Diston's**.....50¢  
**Pocket Levels**.....70¢10¢70¢10¢10¢  
**Stanley's Duplex**.....20¢10¢  
**Stanley's Handy**.....20¢10¢

**Poachers, Egg—**  
**Buffalo Steam Egg Poachers, 1¢ doz.**  
**No. 1, \$6.00; No. 2, \$9.00**.....35¢45¢  
**Silver & Co., 6-Ring, 1¢ doz.**.....\$4.00  
**Ring**.....\$2.00

**Poke Animal—**  
**Bishop's American**.....1¢ doz. \$3.00  
**Bishop's I. X. L.**.....1¢ doz. \$3.00  
**Bishop's Steel Monarch**.....1¢ doz. \$5.00  
**Bishop's Ohio**.....1¢ doz. \$3.00  
**Bishop's Pioneer**.....1¢ doz. \$3.75  
**Bolding**.....1¢ doz. \$5.00  
**Buckeye Single Stale**.....1¢ doz. \$2.50  
**Columbian Double Stale**.....1¢ doz. \$5.00  
**Eagle, Double Stale**.....1¢ doz. \$5.00  
**Eagle, Single Stale**.....1¢ doz. \$5.25  
**Metallic Horse Poke**.....1¢ doz. \$5.00

**Police Goods—**  
**Daley's Improved Handcuffs, 2 Hands,**  
**Polished, 1¢ doz.**.....\$48.00  
**Polished, 3 hands, Polished, 1¢ doz**  
**\$72.00; Nickel, \$84.00**.....25¢  
**J. J. Lovell's Police Goods**.....25¢  
**Newhall Ship Chandlery Co. Hand-**  
**cuffs, \$15.00 1¢ doz.**.....25¢  
**Tower's**.....25¢

**Polish—**  
**Metal**





**Snaps, Harness, &c.**—  
Anchor 1. & S. Mfg. Co. .... 65¢  
Andrews ..... 50¢  
Cover's Saddlery Works' Triumph ..... 85¢  
Covered Spring ..... 60¢  
Cover ..... 50¢  
Cover, New Patent ..... 50¢  
Cover, New R. E. .... 60¢  
Fitch's (Bristol) ..... 60¢  
German, new list ..... 40¢  
Hotchkiss ..... 10¢  
Kelley & Woolworth's Steel Harness ..... 60¢

John Prots Snaps ..... 75¢  
Sargent's Patent Guarded ..... 70¢  
**Snaths**—  
Scythe ..... 50¢

**Soldering Irons**—  
See *Iron, Soldering*.

**Spittoons, Cuspidors, &c.**  
Standard Fiberware—  
Cuspidors, 2 1/2 inch, 1/2 doz., No. 5, 8; No. 12, 9.  
Spittoons, Daisy, 8-inch, No. 1, 10 and 11 inch, 9¢.

**Spoke Shaves**—  
See *Shaves, Spoke*.

**Spoke Trimmers**—  
See *Trimmers, Spoke*.

**Spoons and Forks**—  
Tinned Iron—

Basting, Cen. Stamp. Co.'s list ..... 70¢  
Buffalo, S. & Co. .... 35¢  
Solid Table and Tea, Cen. Stamp. Co.'s list ..... 70¢

**Silver Plated**—  
4 months or 5¢ cash 30 days:

L. Boardman & Son ..... 50¢  
Holmes & Edwards Silver Co. .... 40¢  
Meriden Brit. Co. Rogers ..... 40¢  
Reed & Barton ..... 40¢  
Rogers & Bros. .... 40¢  
C. Rogers & Bros. .... 40¢  
Rogers & Hamilton ..... 40¢  
Wm. Rogers Mfg. Co. .... 40¢  
Simpson, Hall, Miller & Co. .... 40¢

**Miscellaneous**—  
Boardman's Britannia Spoons, case lots ..... 60¢

Boardman's Nickel Silver, list July 1, 1891 ..... 60¢  
Britannia ..... 60¢  
German Silver ..... 60¢  
Nickel Silver ..... 60¢  
Holmes & Edwards Silver Co. .... 40¢

No. 24 German Silver ..... 50¢  
No. 30 Silver Metal ..... 50¢  
No. 49 Nickel Silver ..... 50¢  
No. 67 Mexican Silver ..... 50¢  
Rogers & Hamilton ..... 40¢  
Climet, Flatware ..... 40¢  
Climet, Steel Goods ..... 40¢  
Crown Hamilton, Flatware and Cutlery ..... 30¢  
Steel Goods ..... 40¢

Wm. Rogers Mfg. Co. .... 60¢

13¢ Rogers' Nickel Silver ..... 60¢

22¢ Rogers' Nickel Silver ..... 60¢

Rogers' Silver Metal ..... 50¢

**Springs—Door**—  
Champion (coll) ..... 60¢

Covell's, No. 1, 1/2 doz. \$18.00; No. 2, \$15.00.

Gem (Coll), list April 19, 1888 ..... 20¢

Hercules ..... 50¢

Phoenix ..... 35¢

Rubber, complete, 1/2 doz. \$4.50; 55¢ to 10¢.

Star (Coll), list April 19, 1888 ..... 20¢

Torrey's Rod, 39 in. .... \$1.20 to 1.25

Warner's No. 1, 1/2 doz. \$1.50; No. 2, \$3.40.

Victor (Coll) ..... 60¢

**Carriage Wagon, &c.**  
Elusive, Concord, Platform and Half Scoll ..... 60¢

OH's Roller Springs ..... 25¢

**Sprinklers, Lawn**—  
Gibbs Arc ..... 1/2 doz., \$12.00

Gibbs Hustler ..... 1/2 doz., \$3.00

**Squares**—  
Nickel-Plated ..... 80¢

Try Square and T Bevels ..... 60¢

Avery's Bevel Protractor ..... 60¢

Avery's Flush Bevel Squares ..... 40¢

Disston's Try Square and T Bevels ..... 60¢

Starrett's Micrometer Caliper Squares ..... 60¢

Winterbottom's Try and Miter ..... 30¢

**Squeezers—Fodder**—  
Blair's ..... 1/2 doz. \$2.00

Blair's "Olimax" ..... 1/2 doz. \$1.00

**Lemon**—  
Porcelain Lined, No. 1 ..... 1/2 doz. \$6.00

Wood, Common ..... 1/2 doz. \$1.70 to 1.75

Wood, No. 2 ..... 1/2 doz. \$3.00, 35¢

Dean's, No. 1, 1/2 doz. \$3.50; No. 2, \$1.90; 30¢ to 20¢.

Dunlap's Improved ..... 1/2 doz. \$3.75, 20¢

Hotchkiss Straight Flash ..... 1/2 doz. \$12.00

Jennings' Star ..... 1/2 doz. \$2.50

King ..... 40¢

Little Giant ..... 50¢

Sammis' No. 1, \$5.00; No. 2, \$9; 12; 18; 24; 30; 36; 42; 48; 54; 60; 66; 72; 78; 84; 90; 96; 102; 108; 114; 120; 126; 132; 138; 144; 150; 156; 162; 168; 174; 180; 186; 192; 198; 204; 210; 216; 222; 228; 234; 240; 246; 252; 258; 264; 270; 276; 282; 288; 294; 300; 306; 312; 318; 324; 330; 336; 342; 348; 354; 360; 366; 372; 378; 384; 390; 396; 402; 408; 414; 420; 426; 432; 438; 444; 450; 456; 462; 468; 474; 480; 486; 492; 498; 504; 510; 516; 522; 528; 534; 540; 546; 552; 558; 564; 570; 576; 582; 588; 594; 600; 606; 612; 618; 624; 630; 636; 642; 648; 654; 660; 666; 672; 678; 684; 690; 696; 702; 708; 714; 720; 726; 732; 738; 744; 750; 756; 762; 768; 774; 780; 786; 792; 798; 804; 810; 816; 822; 828; 834; 840; 846; 852; 858; 864; 870; 876; 882; 888; 894; 900; 906; 912; 918; 924; 930; 936; 942; 948; 954; 960; 966; 972; 978; 984; 990; 996; 1000.

**Standard Fiber Ware**—  
See *Standard Fiber*.

**Stables**—  
Barbed Blind, 1/4 in. and larger, 1/2 doz. \$7.75; 3/4 in. \$8.25; 1 in. \$8.75; 1 1/4 in. \$9.25; 1 3/4 in. \$9.75; 2 in. \$10.25; 2 1/4 in. \$10.75; 2 3/4 in. \$11.25; 3 in. \$11.75; 3 1/4 in. \$12.25; 3 3/4 in. \$12.75; 4 in. \$13.25; 4 1/4 in. \$13.75; 4 3/4 in. \$14.25; 5 in. \$14.75; 5 1/4 in. \$15.25; 5 3/4 in. \$15.75; 6 in. \$16.25; 6 1/4 in. \$16.75; 6 3/4 in. \$17.25; 7 in. \$17.75; 7 1/4 in. \$18.25; 7 3/4 in. \$18.75; 8 in. \$19.25; 8 1/4 in. \$19.75; 8 3/4 in. \$20.25; 9 in. \$20.75; 9 1/4 in. \$21.25; 9 3/4 in. \$21.75; 10 in. \$22.25; 10 1/4 in. \$22.75; 10 3/4 in. \$23.25; 11 in. \$23.75; 11 1/4 in. \$24.25; 11 3/4 in. \$24.75; 12 in. \$25.25; 12 1/4 in. \$25.75; 12 3/4 in. \$26.25; 13 in. \$26.75; 13 1/4 in. \$27.25; 13 3/4 in. \$27.75; 14 in. \$28.25; 14 1/4 in. \$28.75; 14 3/4 in. \$29.25; 15 in. \$29.75; 15 1/4 in. \$30.25; 15 3/4 in. \$30.75; 16 in. \$31.25; 16 1/4 in. \$31.75; 16 3/4 in. \$32.25; 17 in. \$32.75; 17 1/4 in. \$33.25; 17 3/4 in. \$33.75; 18 in. \$34.25; 18 1/4 in. \$34.75; 18 3/4 in. \$35.25; 19 in. \$35.75; 19 1/4 in. \$36.25; 19 3/4 in. \$36.75; 20 in. \$37.25; 20 1/4 in. \$37.75; 20 3/4 in. \$38.25; 21 in. \$38.75; 21 1/4 in. \$39.25; 21 3/4 in. \$39.75; 22 in. \$40.25; 22 1/4 in. \$40.75; 22 3/4 in. \$41.25; 23 in. \$41.75; 23 1/4 in. \$42.25; 23 3/4 in. \$42.75; 24 in. \$43.25; 24 1/4 in. \$43.75; 24 3/4 in. \$44.25; 25 in. \$44.75; 25 1/4 in. \$45.25; 25 3/4 in. \$45.75; 26 in. \$46.25; 26 1/4 in. \$46.75; 26 3/4 in. \$47.25; 27 in. \$47.75; 27 1/4 in. \$48.25; 27 3/4 in. \$48.75; 28 in. \$49.25; 28 1/4 in. \$49.75; 28 3/4 in. \$50.25; 29 in. \$50.75; 29 1/4 in. \$51.25; 29 3/4 in. \$51.75; 30 in. \$52.25; 30 1/4 in. \$52.75; 30 3/4 in. \$53.25; 31 in. \$53.75; 31 1/4 in. \$54.25; 31 3/4 in. \$54.75; 32 in. \$55.25; 32 1/4 in. \$55.75; 32 3/4 in. \$56.25; 33 in. \$56.75; 33 1/4 in. \$57.25; 33 3/4 in. \$57.75; 34 in. \$58.25; 34 1/4 in. \$58.75; 34 3/4 in. \$59.25; 35 in. \$59.75; 35 1/4 in. \$60.25; 35 3/4 in. \$60.75; 36 in. \$61.25; 36 1/4 in. \$61.75; 36 3/4 in. \$62.25; 37 in. \$62.75; 37 1/4 in. \$63.25; 37 3/4 in. \$63.75; 38 in. \$64.25; 38 1/4 in. \$64.75; 38 3/4 in. \$65.25; 39 in. \$65.75; 39 1/4 in. \$66.25; 39 3/4 in. \$66.75; 40 in. \$67.25; 40 1/4 in. \$67.75; 40 3/4 in. \$68.25; 41 in. \$68.75; 41 1/4 in. \$69.25; 41 3/4 in. \$69.75; 42 in. \$70.25; 42 1/4 in. \$70.75; 42 3/4 in. \$71.25; 43 in. \$71.75; 43 1/4 in. \$72.25; 43 3/4 in. \$72.75; 44 in. \$73.25; 44 1/4 in. \$73.75; 44 3/4 in. \$74.25; 45 in. \$74.75; 45 1/4 in. \$75.25; 45 3/4 in. \$75.75; 46 in. \$76.25; 46 1/4 in. \$76.75; 46 3/4 in. \$77.25; 47 in. \$77.75; 47 1/4 in. \$78.25; 47 3/4 in. \$78.75; 48 in. \$79.25; 48 1/4 in. \$79.75; 48 3/4 in. \$80.25; 49 in. \$80.75; 49 1/4 in. \$81.25; 49 3/4 in. \$81.75; 50 in. \$82.25; 50 1/4 in. \$82.75; 50 3/4 in. \$83.25; 51 in. \$83.75; 51 1/4 in. \$84.25; 51 3/4 in. \$84.75; 52 in. \$85.25; 52 1/4 in. \$85.75; 52 3/4 in. \$86.25; 53 in. \$86.75; 53 1/4 in. \$87.25; 53 3/4 in. \$87.75; 54 in. \$88.25; 54 1/4 in. \$88.75; 54 3/4 in. \$89.25; 55 in. \$89.75; 55 1/4 in. \$90.25; 55 3/4 in. \$90.75; 56 in. \$91.25; 56 1/4 in. \$91.75; 56 3/4 in. \$92.25; 57 in. \$92.75; 57 1/4 in. \$93.25; 57 3/4 in. \$93.75; 58 in. \$94.25; 58 1/4 in. \$94.75; 58 3/4 in. \$95.25; 59 in. \$95.75; 59 1/4 in. \$96.25; 59 3/4 in. \$96.75; 60 in. \$97.25; 60 1/4 in. \$97.75; 60 3/4 in. \$98.25; 61 in. \$98.75; 61 1/4 in. \$99.25; 61 3/4 in. \$99.75; 62 in. \$100.25; 62 1/4 in. \$100.75; 62 3/4 in. \$101.25; 63 in. \$101.75; 63 1/4 in. \$102.25; 63 3/4 in. \$102.75; 64 in. \$103.25; 64 1/4 in. \$103.75; 64 3/4 in. \$104.25; 65 in. \$104.75; 65 1/4 in. \$105.25; 65 3/4 in. \$105.75; 66 in. \$106.25; 66 1/4 in. \$106.75; 66 3/4 in. \$107.25; 67 in. \$107.75; 67 1/4 in. \$108.25; 67 3/4 in. \$108.75; 68 in. \$109.25; 68 1/4 in. \$109.75; 68 3/4 in. \$110.25; 69 in. \$110.75; 69 1/4 in. \$111.25; 69 3/4 in. \$111.75; 70 in. \$112.25; 70 1/4 in. \$112.75; 70 3/4 in. \$113.25; 71 in. \$113.75; 71 1/4 in. \$114.25; 71 3/4 in. \$114.75; 72 in. \$115.25; 72 1/4 in. \$115.75; 72 3/4 in. \$116.25; 73 in. \$116.75; 73 1/4 in. \$117.25; 73 3/4 in. \$117.75; 74 in. \$118.25; 74 1/4 in. \$118.75; 74 3/4 in. \$119.25; 75 in. \$119.75; 75 1/4 in. \$120.25; 75 3/4 in. \$120.75; 76 in. \$121.25; 76 1/4 in. \$121.75; 76 3/4 in. \$122.25; 77 in. \$122.75; 77 1/4 in. \$123.25; 77 3/4 in. \$123.75; 78 in. \$124.25; 78 1/4 in. \$124.75; 78 3/4 in. \$125.25; 79 in. \$125.75; 79 1/4 in. \$126.25; 79 3/4 in. \$126.75; 80 in. \$127.25; 80 1/4 in. \$127.75; 80 3/4 in. \$128.25; 81 in. \$128.75; 81 1/4 in. \$129.25; 81 3/4 in. \$129.75; 82 in. \$130.25; 82 1/4 in. \$130.75; 82 3/4 in. \$131.25; 83 in. \$131.75; 83 1/4 in. \$132.25; 83 3/4 in. \$132.75; 84 in. \$133.25; 84 1/4 in. \$133.75; 84 3/4 in. \$134.25; 85 in. \$134.75; 85 1/4 in. \$135.25; 85 3/4 in. \$135.75; 86 in. \$136.25; 86 1/4 in. \$136.75; 86 3/4 in. \$137.25; 87 in. \$137.75; 87 1/4 in. \$138.25; 87 3/4 in. \$138.75; 88 in. \$139.25; 88 1/4 in. \$139.75; 88 3/4 in. \$140.25; 89 in. \$140.75; 89 1/4 in. \$141.25; 89 3/4 in. \$141.75; 90 in. \$142.25; 90 1/4 in. \$142.75; 90 3/4 in. \$143.25; 91 in. \$143.75; 91 1/4 in. \$144.25; 91 3/4 in. \$144.75; 92 in. \$145.25; 92 1/4 in. \$145.75; 92 3/4 in. \$146.25; 93 in. \$146.75; 93 1/4 in. \$147.25; 93 3/4 in. \$147.75; 94 in. \$148.25; 94 1/4 in. \$148.75; 94 3/4 in. \$149.25; 95 in. \$149.75; 95 1/4 in. \$150.25; 95 3/4 in. \$150.75; 96 in. \$151.25; 96 1/4 in. \$151.75; 96 3/4 in. \$152.25; 97 in. \$152.75; 97 1/4 in. \$153.25; 97 3/4 in. \$153.75; 98 in. \$154.25; 98 1/4 in. \$154.75; 98 3/4 in. \$155.25; 99 in. \$155.75; 99 1/4 in. \$156.25; 99 3/4 in. \$156.75; 100 in. \$157.25; 100 1/4 in. \$157.75; 100 3/4 in. \$158.25; 101 in. \$158.75; 101 1/4 in. \$159.25; 101 3/4 in. \$159.75; 102 in. \$160.25; 102 1/4 in. \$160.75; 102 3/4 in. \$161.25; 103 in. \$161.75; 103 1/4 in. \$162.25; 103 3/4 in. \$162.75; 104 in. \$163.25; 104 1/4 in. \$163.75; 104 3/4 in. \$164.25; 105 in. \$164.75; 105 1/4 in. \$165.25; 105 3/4 in. \$165.75; 106 in. \$166.25; 106 1/4 in. \$166.75; 106 3/4 in. \$167.25; 107 in. \$167.75; 107 1/4 in. \$168.25; 107 3/4 in. \$168.75; 108 in. \$169.25; 108 1/4 in. \$169.75; 108 3/4 in. \$170.25; 109 in. \$170.75; 109 1/4 in. \$171.25; 109 3/4 in. \$171.75; 110 in. \$172.25; 110 1/4 in. \$172.75; 110 3/4 in. \$173.25; 111 in. \$173.75; 111 1/4 in. \$174.25; 111 3/4 in. \$174.75; 112 in. \$175.25; 112 1/4 in. \$175.75; 112 3/4 in. \$176.25; 113 in. \$176.75; 113 1/4 in. \$177.25; 113 3/4 in. \$177.75; 114 in. \$178.25; 114 1/4 in. \$178.75; 114 3/4 in. \$179.25; 115 in. \$179.75; 115 1/4 in. \$180.25; 115 3/4 in. \$180.75; 116 in. \$181.25; 116 1/4 in. \$181.75; 116 3/4 in. \$182.25; 117 in. \$182.75; 117 1/4 in. \$183.25; 117 3/4 in. \$183.75; 118 in. \$184.25; 118 1/4 in. \$184.75; 118 3/4 in. \$185.25; 119 in. \$185.75; 119 1/4 in. \$186.25; 119 3/4 in. \$186.75; 120 in. \$187.25; 120 1/4 in. \$187.75; 120 3/4 in. \$188.25; 121 in. \$188.75; 121 1/4 in. \$189.25; 121 3/4 in. \$189.75; 122 in. \$190.25; 122 1/4 in. \$190.75; 122 3/4 in. \$191.25; 123 in. \$191.75; 123 1/4 in. \$192.25; 123 3/4 in. \$192.75; 124 in. \$193.25; 124 1/4 in. \$193.75; 124 3/4 in. \$194.25; 125 in. \$194.75; 125 1/4 in. \$195.25; 125 3/4 in. \$195.75; 126 in. \$196.25; 126 1/4 in. \$196.75; 126 3/4 in. \$197.25; 127 in. \$197.75; 127 1/4 in. \$198.25; 127 3/4 in. \$198.75; 128 in. \$199.25; 128 1/4 in. \$199.75; 128 3/4 in. \$200.25; 129 in. \$200.75; 129 1/4 in. \$201.25; 129 3/4 in. \$201.75; 130 in. \$202.25; 130 1/4 in. \$202.75; 130 3/4 in. \$203.25; 131 in. \$203.75; 131 1/4 in. \$204.25; 131 3/4 in. \$204.75; 132 in. \$205.25; 132 1/4 in. \$205.75; 132 3/4 in. \$206.25; 133 in. \$206.75; 133 1/4 in. \$207.25; 133 3/4 in. \$207.75; 134 in. \$208.25; 134 1/4 in. \$208.75; 134 3/4 in. \$209.25; 135 in. \$209.75; 135 1/4 in. \$210.25; 135 3/4 in. \$210.75; 136 in. \$211.25; 136 1/4 in. \$211.75; 136 3/4 in. \$212.25; 137 in. \$212.75; 137 1/4 in. \$213.25; 137 3/4 in. \$213.75; 138 in. \$214.25; 138 1/4 in. \$214.75; 138 3/4 in. \$215.25; 139 in. \$215.75; 139 1/4 in. \$216.25; 139 3/4 in. \$216.75; 140 in. \$217.25; 140 1/4 in. \$217.75; 140 3/4 in. \$218.25; 141 in. \$218.75; 141 1/4 in. \$219.25; 141 3/4 in. \$219.75; 142 in. \$220.25; 142 1/4 in. \$220.75; 142 3/4 in. \$221.25; 143 in. \$221.75; 143 1/4 in. \$222.25; 143 3/4 in. \$222.75; 144 in. \$223.25; 144 1/4 in. \$223.75; 144 3/4 in. \$224.25; 145 in. \$224.75; 145 1/4 in. \$225.25; 145 3/4 in. \$225.75; 146 in. \$226.25; 146 1/4 in. \$226.75; 146 3/4 in. \$227.25; 147 in. \$227.75; 147 1/4 in. \$228.25; 147 3/4 in. \$228.75; 148 in. \$229.25; 148 1/4 in. \$229.75; 148 3/4 in. \$230.25; 149 in. \$230.75; 149 1/4 in. \$231.25; 149 3/4 in. \$231.75; 150 in. \$232.25; 150 1/4 in. \$232.75; 150 3/4 in. \$233.25; 151 in. \$233.75; 151 1/4 in. \$234.25; 151 3/4 in. \$234.75; 152 in. \$235.25; 152 1/4 in. \$235.75; 152 3/4 in. \$236.25; 153 in. \$236.75; 153 1/4 in. \$237.25; 153 3/4 in. \$237.75; 154 in. \$238.25; 154 1/4 in. \$238.75; 154 3/4 in. \$239.25; 155 in. \$239.75; 155 1/4 in. \$240.25; 155 3/4 in. \$240.75; 156 in. \$241.25; 156 1/4 in. \$241.75; 156 3/4 in. \$242.25; 157 in. \$242.75; 157 1/4 in. \$243.25; 157 3/4 in. \$243.75; 158 in. \$244.25; 158 1/4 in. \$244.75; 158 3/4 in. \$245.25; 159 in. \$245.75; 159 1/4 in. \$246.25; 159 3/4 in. \$246.75; 160 in. \$247.25; 160 1/4 in. \$247.75; 160 3/4 in. \$248.25; 161 in. \$248.75; 161 1/4 in. \$249.25; 161 3/4 in. \$249.75; 162 in. \$250.25; 162 1/4 in. \$250.75; 162 3/4 in. \$251.25; 163 in. \$251.75; 163 1/4 in. \$252.25; 163 3/4 in. \$252.75; 164 in. \$253.25; 164 1/4 in. \$253.75; 164 3/4 in. \$254.25; 165 in. \$254.75; 165 1/4 in. \$255.25; 165 3/4 in. \$255.75; 166 in. \$256.25; 166 1/4 in. \$256.75; 166 3/4 in. \$257.25; 167 in. \$257.75; 167 1/4 in. \$258.25; 167 3/4 in. \$258.75; 168 in. \$259.25; 168 1/4 in. \$259.75; 168 3/4 in. \$260.25; 169 in. \$260.75; 169 1/4 in. \$261.25; 169 3/4 in. \$261.75; 170 in. \$262.25; 170 1/4 in. \$262.75; 170 3/4 in. \$263.25; 171 in. \$263.75; 171 1/4 in. \$2

**Whips**

American Whip Co.: Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalbone Driving.....	\$18.00	\$20.00	\$22.00	\$24.00	\$27.00	\$30.00	\$33.00	\$36.00
Bureka, Two-thirds Whalbone.....	15.00	16.50	18.00	20.00	22.00	24.00	26.00	28.00
Bull Bone, Half-length Whale bone.....	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00
American Standard.....	8.00	8.50	9.00	10.00	11.00	12.00	13.00	14.00
True Grip, Raw Hide Center.....	6.00	6.00	6.50	7.00	7.50	8.00	8.50	9.00
New Name, Stocked Java, Black and Wine Colors.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Americans, 98 Pen Whip.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Gents' Light Driving No. 111.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Gents' Light Driving No. 106.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Hand-made Stocked Java No. 105.....	8.75	4.00	4.00	4.00	4.00	4.00	4.00	4.00
A large variety of cheaper grades.....	50¢	50¢	50¢	50¢	50¢	50¢	50¢	50¢
Team Whips.....	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
Toy Whips.....	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
Hardware Assortment, 10/American, 75 Whips for \$50.00.....	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50

**Wire and Wire Goods—****Iron—****Market,**

Br. & Ann., Nos. 0 to 18.....	Extra 5¢ to 10¢
Cop'd, Nos. 0 to 18.....	often given
Galv., Nos. 0 to 18.....	and low net
Tin'd, Tin'd list, Nos. 0 to 18.....	prices often
	made on
	large lots.

Stone, Br. & Ann'd, Nos. 16 to 18.....	80%	Extra 10%
Nos. 19 to 26.....	80%	often given.
Nos. 27 to 36.....	80%	
Ann'd Wire on Spools.....	60%	
Brass list Jan. 18, 1894.....	40%	
Cast Steel Wire.....	50%	
Copper, list Jan. 18, 1894.....	40%	
Galvanized Fence.....	75%	
Malin's Ann'd & Tin'd on Spools.....	80%	
Malin's Brass and Cop. on Spools.....	50%	

Steel Music Wire, 12 to 30, imported.....  
 Stubs' Steel Wire.....  
 Tate's Spooled, Tin'd & Annealed.....  
 Tate's Spooled Cop. and Brass.....  
 Tinned Broom Wire, 18 to 24, # 1.....  
 Wire Clothes Line, see Lines.....  
 Wire Picture Cord, see Cord.....

**Bright Wire Goods—**

Standard list.....  
 Wire Cloth and Netting—  
 Galvanized Wire Netting.....

Painted Screen Cloth # 100 ft \$1.45 to \$1.50

**Wire Barb—**

See Trade Report.

**Wire Rope—See Rope, Wire.****Wrenches—**

American Adjustable.....	40%
Baxter's Adjustable "8".....	40%
Baxter's Diagonal.....	60%
Coe's Genuine.....	50%
Coe's "Mechanics".....	50%
Girard Standard.....	60%
Lamson & Sessions' Engineers'.....	60%
Lamson & Sessions' Standard.....	70%
Girard Agricultural.....	75%
Lamson & Sessions' Agric'l.....	75%
F. S. & W. Agricultural.....	80%
W. & B. Diamond.....	80%
Acme, Bright.....	50%
Acme, Nickle.....	40%

Aiken's Pocket (Bright).....	\$6.00, 50¢ to 10¢
Alligator.....	50%
Always Ready.....	25%
Bemis & Call's.....	35%
Adjustable S.....	80%
Bragg's Pattern.....	80%
Combination Black.....	40%
Combination Bright.....	40%
Cylinder or Gas Pipe.....	45%
Extra Heavy.....	45%
Marshall's Pattern.....	45%
No. 3 Pipe Bright.....	45%
Bit Wrench, Adj., Tamm's.....	\$2.25, 25¢ to 10¢

Boardman's.....	30%
Cincinnati Brace Wrenches.....	25%
Diamond Steel.....	55%
Donohue's Engineer.....	20%
Eagle.....	50%
Hercules.....	70%
Tatter Vise Wrench.....	55%
The Favorite Pocket.....	\$4.00, 40%
Walker's.....	55%
Webster's Pat. Combination.....	35%

**Wringers, Clothes—**

Am. Wringer Co., list, July 1, '93.....	2¢ cash
Colby Wringer Co., list, May 1, '94.....	2¢ cash
Lovell Mfg. Co., list, July 1, 1892.....	2¢ cash
Peerless Mfg. Co., list, Feb., 1892.....	2¢ cash
National Wringer & Mfg. Co., list, June 1, 1892.....	2¢ cash

**Wrought Goods—**

Staples, Hooks, &c., list, March 17, 1893.....	85¢ to 10¢ to 15¢
--	-------------------

**Paints, Oils and Colors.—Wholesale Prices.****Animal and Vegetable Oils—**

Linseed, City, raw, per gal.....	58	55
Linseed, City, boiled.....	56	50
Linseed, Western, raw.....	59	60
Lard, City, Extra Winter.....	59	60
Lard, City, Prime.....	59	60
Lard, City, Extra No. 1.....	59	60
Lard, City, No. 1.....	59	60
Lard, Western, prime.....	59	60
Cotton-seed, Crude, prime.....	26	29
Cotton-seed, Crude, off grades.....	26	28
Cotton-seed, Summer Yellow, prime.....	32	33
Cotton-seed, Summer Yellow, off grades.....	30	31
Sperm, Crude.....	60	63
Sperm, Natural Spring.....	65	67
Sperm, Bleached Spring.....	65	67
Sperm, Natural Winter.....	65	67
Sperm, Bleached Winter.....	70	72
Whale, Crude.....	40	42
Whale, Bleached Winter.....	45	47
Whale, Extra Bleached.....	47	49
Sea Elephant, Bleached Winter.....	28	29
Menhaden, Crude, Sound.....	25	26
Menhaden, Crude, Southern.....	34	35
Menhaden, Light Pressed.....	38	39
Menhaden, Bleached Winter.....	40	41
Menhaden, Extra Bleached.....	43	44
Tallow, City, prime.....	45	46
Tallow, Western, prime.....	45	46
Cocconut, Ceylon.....	54	54
Cocconut, Cochiti.....	74	74
Cod, Domestic.....	35	37
Cod, Foreign.....	36	38
Red Saponified.....	43	43
Bank.....	35	35
Straits.....	36	38
Olive, Italian, bbls.....	56	58
Neatfoot, prime.....	60	65
Palm, prime, Lagos.....	54	54

**Mineral Oils—**

Black, 29 gravity, 25 to 30 cold test.....	7	7 1/2
Black, 29 gravity, 15 cold test.....	7	8
Black, 29 gravity, summer.....	5 1/2	6 1/2

Cylinder light, filtered.....	12	16
Cylinder, dark, filtered.....	10	13
Paraffine, 23 1/2 gravity.....	11	12
Paraffine, 24 gravity.....	11	12
Paraffine, 25 gravity.....	11	12
Paraffine, red.....	11	12

**Paints and Colors—**

Barytes, Foreign, 10 ton.....	\$22.00	\$24.00
Barytes, Amer. 10 ton.....	\$22.00	\$24.00
Paraffine, Amer. No. 1.....	16.00	18.00
Barytes, Amer. No. 2.....	13.00	15.00
Barytes, Amer. No. 3.....	11.00	12.00
Blue, Celestial.....	4	6
Blue, Chinese.....	4	6
Blue, Prussian.....	25	40
Blue, Ultramarine.....	8	25
Brown, Spanish.....	3	4
Brown, Vandyke, Amer.....	3	3 1/2
Brown, Vandyke, English.....	6	8
Carmine, No. 40, in bulk.....	2.00	2.00
Carmine, No. 40, in boxes.....	2.10	2.10
Carmine, No. 40, in ounce bottles.....	3.00	3.00
Chalk, in bulk.....	1.75	2.00
Chalk, in bbls.....	33	40
China Clay, English.....	13.00	18.00
Cobalt Oxide, prep'd.....	9.00	11.00
Cobalt Oxide, lots 100 lb.....	1.90	1.90
Cobalt Oxide, black.....	1.96	1.96
Green, Paris, in bulk.....	23	23
Green, Paris, 170 to 175 lb.....	23	23
Green, Paris, small pack.....	25	29 1/2
Rebates, 3¢ # on lots of 10,000 lb or over; 2 1/2¢ on 4,000 to 10,000 lb; 2¢ on 2,000 to 4,000 lb; 1 1/2¢ on 1,000 to 2,000 lb; 1¢ on 500 to 1,000 lb purchased during the season.....	6	12
Green, Chrome, ordinary.....	22	25
Lead, Eng. B.B. white.....	7	8
Lead, Amn. White.....	4 1/2	4 1/2
Dry.....	5 1/2	6 1/2
In Oil.....	5 1/2	6 1/2
Lead, White, in oil, 25 lb tin.....	1 1/2	1 1/2
Lead, White, in oil, 12 1/2 lb tin.....	1 1/2	1 1/2
Lead, White, add to keg price.....	1	1
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price.....	2 1/2	2 1/2

Lead, Red, bbls. and 1/2 bbls.....	5 1/2	6 1/2
Lead, Red, kegs.....	5 1/2	6 1/2
Litharge, bbls. and 1/2 bbls.....	5 1/2	6 1/2
Ocher, Rochelle.....	1.35	1 1/2
Ocher, French Washed.....	1 1/2	2 1/2
Ocher, German Washed.....	1 1/2	2 1/2
Ocher, American.....	1 1/2	2 1/2
Orange Mineral, English.....	10	10 1/2
Orange Mineral, French.....	7 1/2	8
Orange Mineral, German.....	7 1/2	8
Orange Mineral, American.....	7 1/2	8
Red, Indian, English.....	5	15
Red, Indian, American.....	2	5
Red, Turkey.....	9	14
Red, Tuscan.....	7	10
Red, Venetian, American.....	70	100
Red, Venetian, English.....	1.10	1.35
Sienna, Italian, Burnt and Powd.....	4	5
Sienna, Ital., Burnt Lumps.....	1 1/2	3 1/2
Sienna, Ital., Raw, Powd.....	1 1/2	3 1/2
Sienna, Ital., Raw, Lumps.....	1 1/2	3 1/2
Sienna, American, Raw.....	1 1/2	3 1/2
Sienna, American, Burnt and Powd.....	1 1/2	3 1/2
Talc, French.....	1 1/2	1 1/2
Talc, American.....	1	1 1/2
Terra Alba, Frch. # 100 lb.....	65	75
Terra Alba, English.....	65	75
Terra Alba, American No. 1.....	65	75
Terra Alba, American No. 2.....	45	50
Umber, Turkey, Burnt and Powd.....	2 1/2	3 1/2
Umber, Turkey, Raw and Powd.....	2 1/2	3 1/2
Umber, Turkey, R. Lumps.....	2 1/2	3 1/2
Umber, Turkey, Bnt. Amer.....	1 1/2	1 1/2
Yellow, Chrome.....	10	25
Vermilion, American Lead.....	11	12
Vermilion, Quicksilver, bulk.....	43	44
Vermilion, Quicksilver, bags.....	44	44
Vermilion, Quicksilver, amt' pkgs.....	52	60
Vermilion, English Import.....	55	60
Vermilion, Imitation, Eng.....	8	30
Vermilion, Trieste.....	90	95
Vermilion, Chinese.....	85	100
Whiting, Common, # 100 lb.....	40	45
Whiting, Gliders.....	60	65
Zinc, American, dry.....	3 1/2	4 1/2
Zinc, French, Red Seal.....	7	7 1/2

Zinc, Frch, Green Seal.....	8 1/2	9
Zinc, Frch, V. M. X.....	6	7
Zinc, Antwerp, Red Seal.....	6	6 1/2
Zinc, Antwerp, Green Seal.....	6 1/2	7 1/2
Zinc, German, L. Z. O.....	5	5 1/2
Zinc, V. M. in Poppy Oil, Seal, lots of 1 ton and over.....	10 1/2	11
Zinc, V. M. in Poppy Oil, lots less than one ton.....	11	11 1/2
Zinc, V. M. in Poppy Oil, Red Seal.....	10 1/2	11
lots of 1 ton and over.....	10 1/2	11
lots of less than 1 ton.....	10 1/2	11
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1¢; 25 bbls. 2¢; 50 bbls. 3¢. No discount allowed on less than bbl. lots.		

**Colors in Oil—**

Black, Drop, Frankfort.....	25	30
Black, Drop, English.....	12	15
Black, Drop, Domestic.....	7	10
Black, Lampblack, Best.....	20	35
Black, Lampblack, Common.....	7	13
Black, Ivory.....	8	15
Blue, Chinese.....	25	40
Blue, Prussian.....	25	40
Blue, Ultramarine.....	12	18
Brown, Vandyke.....	7	12
Green, Chrome.....	8	13
Green, Paris.....	16	18 1/2
Sienna, Raw.....	7	14
Sienna, Burnt.....	7	14
Umber, Raw.....	7	10
Umber, Burnt.....	7	10

**Putty—**

In barrels and 1/2 bbls.....	.013¢	.013¢
In tubs.....	.013¢	.013¢
In tin cans.....	.013¢	.013¢
In bladders.....	.013¢	.013¢

**Spirits Turpentine—**

In regular bbls.....	29 1/2	30
In machine bbls.....	30	30 1/2

**Glue—**

Low Grade.....	7	9
Cabinet.....	11	14
Medium White.....	12	14
Extra White.....	10	10
French.....	10	10
English.....	10	10
Irish.....	10	12 1/2

**THE IRON AGE.**

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

**RATES OF SUBSCRIPTION: INCLUDING POSTAGE.****UNITED STATES AND BRITISH AMERICA.**

Weekly Edition, Issued every Thursday morning..... \$4.50 a year.

Semi-Monthly Edition, First and Third THURSDAYS of every month..... \$3.30

Monthly Edition First THURSDAY of every month..... \$1.15

**ALL OTHER COUNTRIES.**

Per Annum, Postpaid.

Weekly Edition: \$5.00 = £1 = 25 francs = 20 marks = 11 florins = 6 roubles (coin) = 25 lire = 20 pesetas.

Semi-Monthly Edition: \$2.50 = £10 = 12 1/2 francs = 10 marks = 6 florins = 3 roubles (coin) = 12 1/2 lire = 10 pesetas.

Monthly Edition: \$1.25 = £5 = 6 1/4 francs = 5 marks = 3 florins = 1 1/2 roubles (coin) = 6 1/4 lire = 5 pesetas.

**RATES OF ADVERTISING: ONE SQUARE (12 LINES, ONE INCH).****ONE INSERTION****ONE MONTH****THREE MONTHS**

New York (Main Office), Philadelphia, Pittsburgh,

Chicago, Cincinnati, St. Louis, Boston, Cleveland,

96-102 Reade Street, 220 South Fourth Street, Room 509, Hamilton Building,

59 Dearborn Street, cor. Randolph, Rooms 22-24 Pickering Building, Bank of Commerce Building,

146 Franklin Street, 312 The Cuyahoga,

**SIX MONTHS****ONE YEAR****Rates for larger spaces quoted on application**

DAVID WILLIAMS, Publisher

THOMAS HOBSON, Manager.

ROBERT A. WALKER, Manager.

J. K. HANES, Business Manager.

GEO. W. COPE, Resident Asso. Ed.

HENRY SMITH, Manager.

H. H. ROBERTS, Manager.

WALTER C. ENGLISH, Manager.

EZRA S. ADAMS, Manager.

JUNE 20, 1894.

## IRON AND STEEL— Bar Iron from Store—

<b>Tin Boiler Plates—</b>			<b>12.00</b>
IXX,	14 x 28	112 sheets	\$13.35
IXX,	14 x 28	112 sheets	14.50
IXX,	14 x 31	112 sheets	10.00
<b>American Terne Plates.—Apollo</b>			
IC,	14 x 20		\$5.50
IC,	20 x 28		11.00
IX,	14 x 20		6.50
IX,	20 x 28		13.00

Common High Brass:	in.	in.	in.	in.	in.	in.	in.	in.
Wider than	2	10	12	14	16	18	20	22
and including	10	12	14	16	18	20	22	24
To No. 20, inclusive.....	22	23	25	27	29	31	33	36
Nos. 21, 22, 23 and 24.....	22	24	26	28	30	32	34	37
Nos. 25 and 26.....	23	24½	27	29	31	33	35	38
Nos. 27 and 28.....	23	25	28	30	32	34	36	38

<i>Dealers' Purchasing Prices Paid in New York.</i>	
Heavy Copper.....	\$ 6 3/4
Light and Tinned Copper.....	\$ 6 1/2
Heavy Brass.....	\$ 4 1/2
Light Brass.....	\$ 3 3/4
Lead.....	\$ 2 3/4
Tea Lead.....	\$ 2 1/4
Zinc.....	\$ 2
No. 1 Pewter.....	\$ 12
No. 2 Pewter.....	\$ 6
Wrought Scrap Iron.....	\$ gross ton \$8.00
Heavy Cast Scrap.....	\$ gross ton 7.00
Plate Scrap.....	\$ gross ton 7.00
Burnt Iron.....	\$ gross ton 2.50

---

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

<https://books.google.com>

